TYAN

Thunder n3600QX /// S4987

Version 1.00

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Notice

Table of Contents

Before you begin…

Check the box contents!

The retail motherboard package should contain the following:
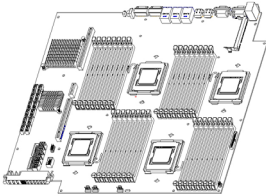
1 x Thunder n3600QX (S4987) motherboard

1 x Thunder n3600QX user's manual

1 x Thunder n3600QX quick reference guide

1 x TYAN driver CD

If any of these items are missing, please contact your vendor/dealer for replacement before continuing with the installation process.

NOTE: For other usable accessories, please refer to Appendix IV for more details.

Chapter 1: Instruction

1.1 - Congratulations

You have purchased one of the most powerful server solutions. Based on NVIDIA nForce Pro3600 chipset, the Thunder n3600QX (S4987) is designed to support AMD® Opteron™ Socket F (1207) 8000 series dual-core and Quad-core processors and up to 128GB DDRII-667 memory, providing a rich feature set and incredible performance. Leveraging advanced technology from AMD, the Thunder n3600QX (S4987) is capable of offering scalable 32 and 64-bit computing, high-bandwidth memory design, and lightning-fast PCI-E, PCI-X bus or HTX slot implementation.

The Thunder n3600QX (S4987) not only empowers your company in today's demanding IT environment but also offers a smooth path for future application usage. TYAN is also proud to deliver the Thunder n3600QX (S4987) in SATAII/SAS flavor. All of this provides the Thunder n3600QX (S4987) the power and flexibility to meet the needs of nearly any server application.

Remember to visit TYAN's Website at **http://www.tyan.com**. There you can find information on all of TYAN's products with FAQs, online manuals and BIOS upgrades.

1.2 - Hardware Specifications

Processors
- Quad mPGA 1207-pin sockets
- Supports Four AMD Opteron™ Socket F (1207) 8000 series processors

Chipset
- nVidia nForce Pro 3600 (MCP55)
- Winbond 83627HG Super I/O
- Winbond w83793G Hardware Monitoring IC

Memory
- Dual channel memory bus
- Thirty-two (32) DDR2 DIMM sockets (Eight per CPU)
- Maximum of 128GB Registered DDR2-400/533/667
- Supports ECC memory

Integrated I/O
- Tyan Barebone 2 x 14 front-panel

Expansion Slots
- One (1) PCI-E x16 slot (w/ x 16 signal), via Riser
  ---broken into 2 x 8 signals via 2U Riser (Optional)
- One (1) HTX slot
- 200-pin OPMA connector support M3 OPMA card (LAN onboard)

System Management
- Winbond 83627HF and Winbond w83793G w/ hardware monitoring
- CPU thermal & voltage monitor support
- Onboard 8 fan header: 4 CPU fan connector / 4 system fan header
- One backplane fan control header for Barebone FAN/HDD backplane.
- Watchdog timer support
- Port 80 code display LED

pin header
- Four SAS ports
- Four SATA ports
- One IDE connector
- Two USB headers
- One COM port header at 3.0Gb/s

Rear Side
- One InfiniBand connector (apart from I/O backplane, optional)
- External SAS connector (four-in-one)
- Three RJ-45 ports with LEDs
  - One RJ-45 100 for OPMA card use
  - Two (side by side) RJ-45 10/100/1000 for LAN ports
- Two (side-by-side) USB 2.0 ports (single port)
- One VGA port
- One COM port
- PS/2 mouse and keyboard connector
- ID LED
- IB/SAS LED

Onboard InfiniBand Network Controller (optional)
- Mellanox InfiniHost III Lx DDR MT25204A0-FCC-D single port
- Memory on DIMM, PCI-E x8 interface
- DDR model as default
- S4987WG2NR: w/o IB onboard; S4987WG2NRI2: w/ IB onboard.

Onboard Graphics Controller
- ATI® ES1000 controller
- 32MB DDR frame buffer

Integrated SAS Controller
- LSI 1068E SAS controller
- PCI-E x4 interface
- Supports eight SAS ports (4 ports internal, 4 ports external)
- RAID 0,1, and 1E supported

Integrated SATA Controllers
- Supports Four (4) SATA-II ports running at 3.0Gb/s from MCP55
- RAID 0, 1, 5, 10 capable

Integrated LAN Controllers
- Two GbE via Marvell PHY 88E1121
- Supports WOL and PXE
- Two RJ-45 ports with LED

BIOS
- AMI 8Mbit LPC Flash ROM
- Serial Console Redirect
- USB boot supported
- Supports APM1.2 and ACPI
- PnP, DMI, WfM power Management
- S0/S1/S4/S5 states supported

Form Factor
- 16.63"x 16.098"

Power Supply
- 12V and 5VSB input only.
- On board connector : FCI 51915-080

Regulatory
- FCC Class A (DoC)
- European Community CE (DoC)
- VCCI
- C-tick
- BSMI (Optional)

1.3 - Software Specifications

For OS (operation system) support, please check with Tyan support for latest information.

Chapter 2: Board Installation

You are now ready to install your motherboard.

How to install our products right… the first time

The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap.
(2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
(3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
(4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
(5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

NOTE	**DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

2.1- Board Image
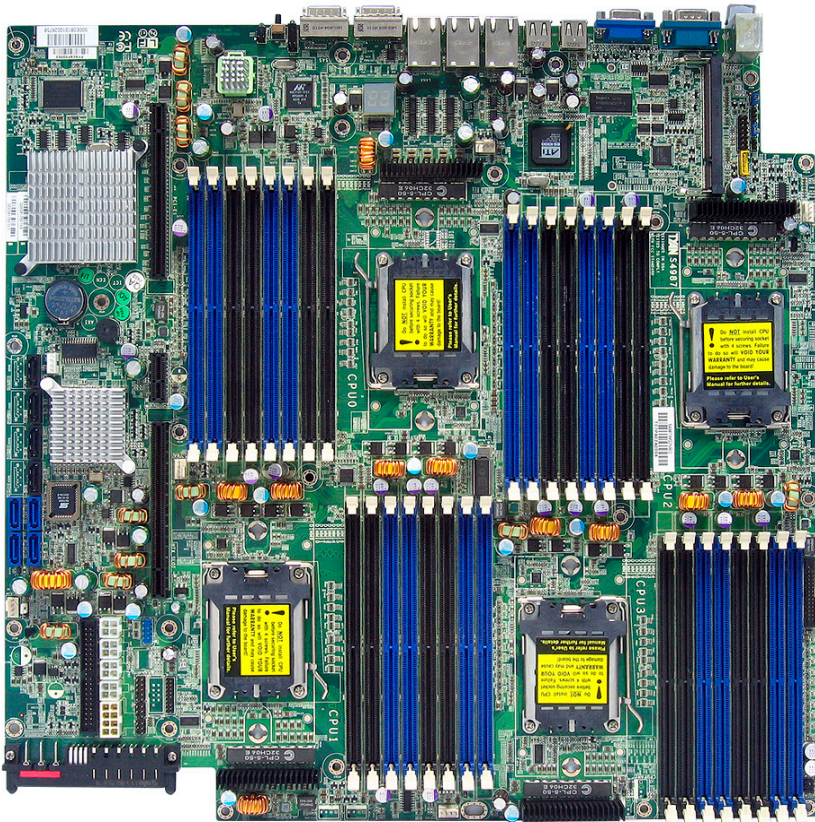
This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

2.2 - Block Diagram
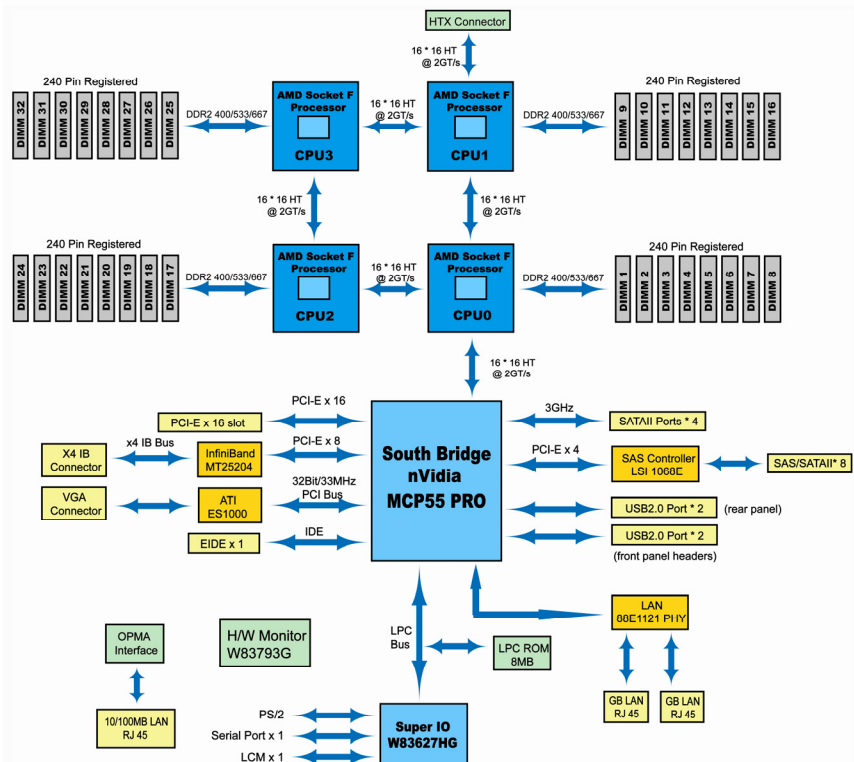
Thunder n3600QX (S4987) Block Diagram

2.3 - Board Parts, Jumpers and Connectors
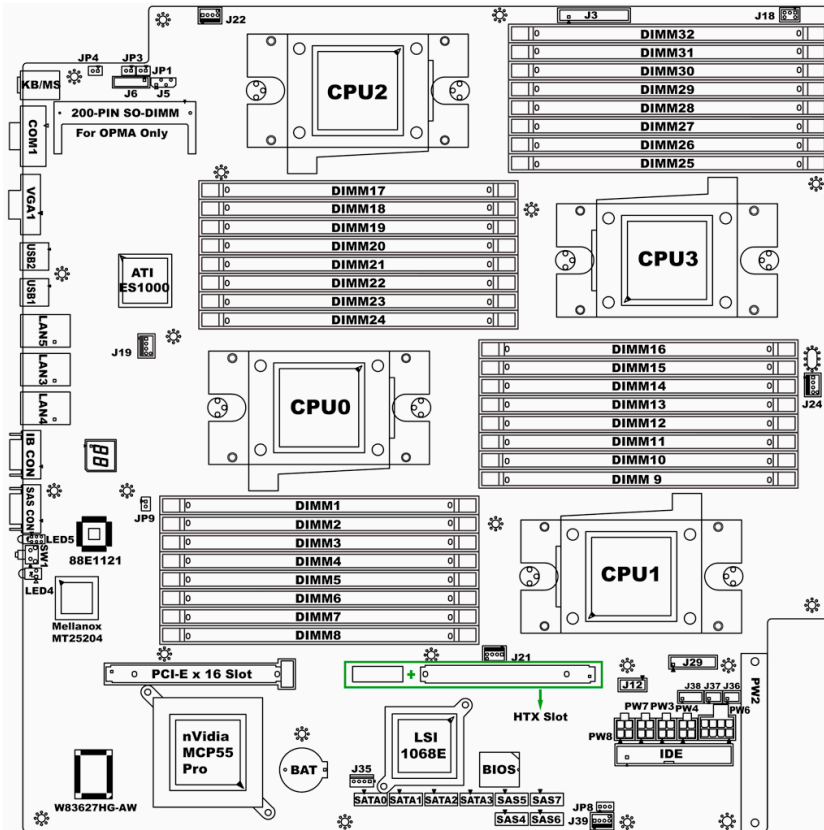
This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram. But **for the DIMM number please refer to the above placement for memory installation.** For the latest board revision, please visit: **www.tyan.com**

Jumpers & Connectors

Jumper/Connector	Function
J3	Front Panel Header (14Pin x 2)
J5	IPMB Pin Header (4Pin x 1)
J12	USB Pin Header (5Pin x 2)
J18	LCM Pin Header (3Pin x 2)
J29	FAN Tach Connector (9Pin x 2)
J19/J21/J22/J24/J39	FAN Connector (4Pin x 1)
J35	M2061 PWR Connector (4Pin x 1)
J36/J37	SAS SGPIO Connector (3Pin x 2)
J38	SAS Fault LED Connector (5Pin x 2)
JP3/JP4	OPMA Setting Jumper (2Pin)
JP8	Clear CMOS (3Pin)
JP9	Chassis Intrusion Header (2Pin)
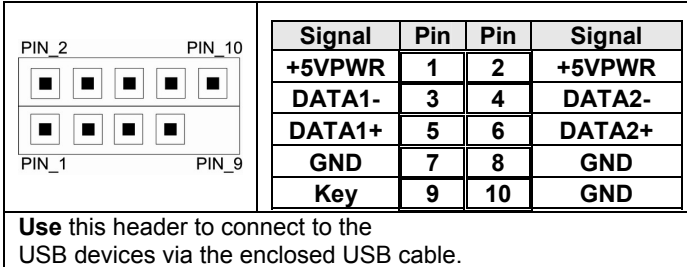
Jumper Legend

▣ ▣	**OPEN - Jumper OFF**	**Without jumper cover**
▣ ▣	**CLOSED - Jumper ON**	**With jumper cover**

Pin-1	**To indicate the location of pin-1**
Pin-1	**To indicate the location of pin-1**

Jumper Placement

J3: Front Panel Connector (14Pin x 2)

Signal	Pin	Pin	Signal
HD LED+	**1**	**2**	HD LED-
Reset Button+	**3**	**4**	Reset Button-
PW LED+	**5**	**6**	PW LED-
Fault LED+	**7**	**8**	Fault LED-
SM BUS DATA	**9**	**10**	SM BUS CLK
NMI Button	**11**	**12**	NMI Button-
5VSB	**13**	**14**	INTRUDER#
PWR Button+	**15**	**16**	PWR Button-
LAN2 LED+	**17**	**18**	LAN2 LED-
LAN1 LED+	**19**	**20**	LAN1 LED-
Reserve	**21**	**22**	Reserve
ID LED+	**23**	**24**	ID LED-
ID LED Button+	**25**	**26**	ID LED Button-
KEY PIN	**27**	**28**	NC

J5: IPMB Pin Header (4Pin x 1)

Signal	Pin	Pin	Signal
IPMB DATA	1	2	GND
IPMB CLK	3	4	NC

J12: USB Pin Header (5Pin x 2)

Signal	Pin	Pin	Signal
+5VPWR	1	2	+5VPWR
DATA1-	3	4	DATA2-
DATA1+	5	6	DATA2+
GND	7	8	GND
Key	9	10	GND

Use this header to connect to the
USB devices via the enclosed USB cable.

J18: LCM Pin Header (3Pin x 2)

Signal	Pin	Pin	Signal
VCC_5_RUN	1	2	RXD
KEY PIN	3	4	GND
VCC_5_DUAL	5	6	TXD

Use this header to connect
the LCM module with system monitoring function.

J29: FAN Tach Connector (9Pin x 2)

Signal	Pin	Pin	Signal
FAN_TACH1	1	2	FAN_TACH2
FAN_TACH3	3	4	FAN_TACH4
FAN_TACH5	5	6	FAN_TACH6
FAN_TACH7	7	8	FAN_TACH8
FAN_TACH9	9	10	FAN_TACH10
Reserve	11	12	KEY PIN
FAN_PWM2	13	14	FAN_PWM1
FAN_TACH11	15	16	FAN_TACH12
FAN_TACH13	17	18	FAN_TACH14
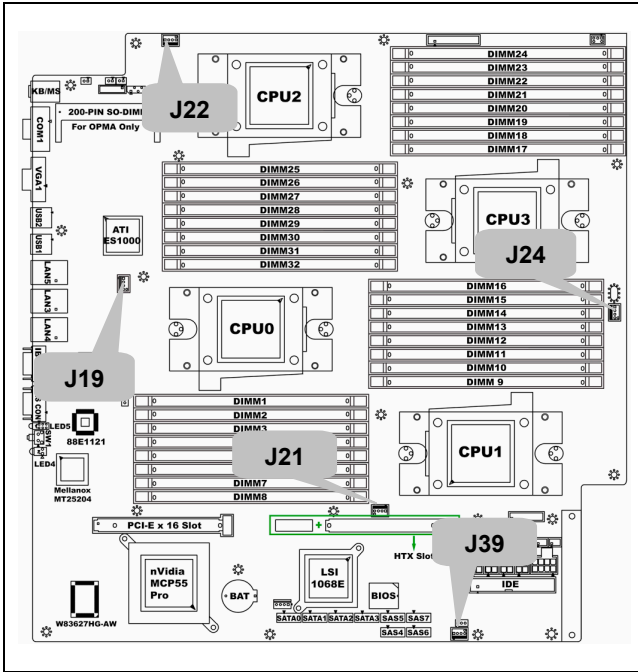
J19/J21/J22/J24/J39: FAN Connector (4Pin x 1)

Pin	1	2	3	4
Signal	PWM	TACH	+12V	GND

Pin_1

NOTE: Pin 1 is not used when the FAN only have three pins.
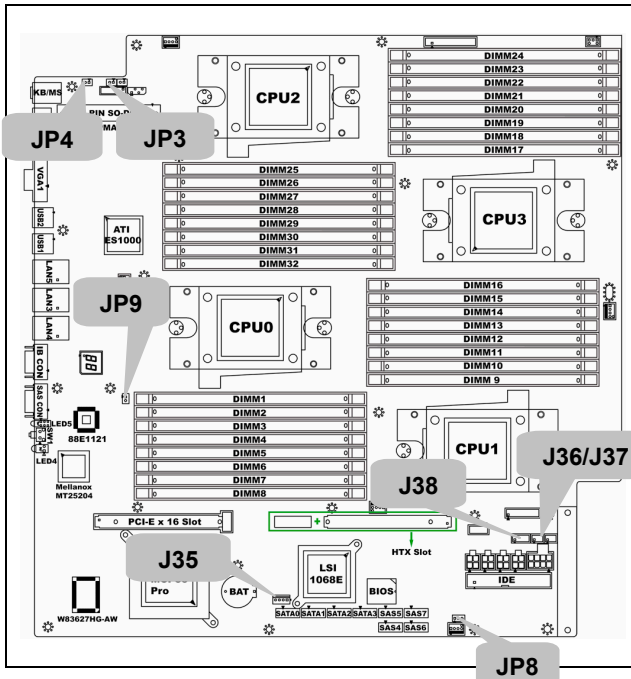
J35: M2061 PCI-E to PCI-X Riser Connector (4Pin x 1)

Pin	1	2	3	4
Signal	N/C	GND	GND	VDD_5_RUN

J36/J37: SAS SGPIO Connector (3Pin x 2)

Signal	Pin	Pin	Signal
SAS_SIO_DIN	1	2	SAS_SIO_DOUT
SAS_SIO_CLK	3	4	GND
KEY PIN	5	6	SAS_SIO_END

J38: SAS Fault LED Connector (5Pin x 2)

Signal	Pin	Pin	Signal
SAS_FAULT_LED_N0	1	2	SAS_FAULT_LED_N1
SAS_FAULT_LED_N2	3	4	SAS_FAULT_LED_N3
SAS_FAULT_LED_N4	5	6	SAS_FAULT_LED_N5
KEY PIN	7	8	SAS_FAULT_LED_N7
SAS_FAULT_LED_N6	9	10	GND

PIN_2   PIN_10

PIN_1   PIN_9

JP3/JP4: OPMA Setting Jumper (2Pin)

	Install: TYAN OPMA Card (Default)
	Remove: Other OPMA Card

JP8: Clear CMOS

Pin_3 ▣▣▣ Pin_1 **Normal (Default)**	You can reset the CMOS settings by using this jumper if you have forgotten your system/setup password or need to clear system BIOS setting.
	- Power off system and **disconnect both power connectors from the motherboard**
Pin_3 ▣▣▣ Pin_1 **Clear CMOS**	- Put jumper cap back to Pin_1 and Pin_2 (default setting) - Use jumper cap to close Pin_2 and Pin_3 for several seconds to Clear CMOS
	Reconnect power & power on system

2.4 - Installing the Processor

Your brand new Thunder n3600QX (S4987) supports the latest 64-bit processor technology from AMD®. Only AMD® Opteron™ Socket F 8000 series processors are certified and supported with this motherboard.
Check our website for latest processor support. **http://www.tyan.com**

TYAN is not liable for damage as a result of operating an unsupported configuration.
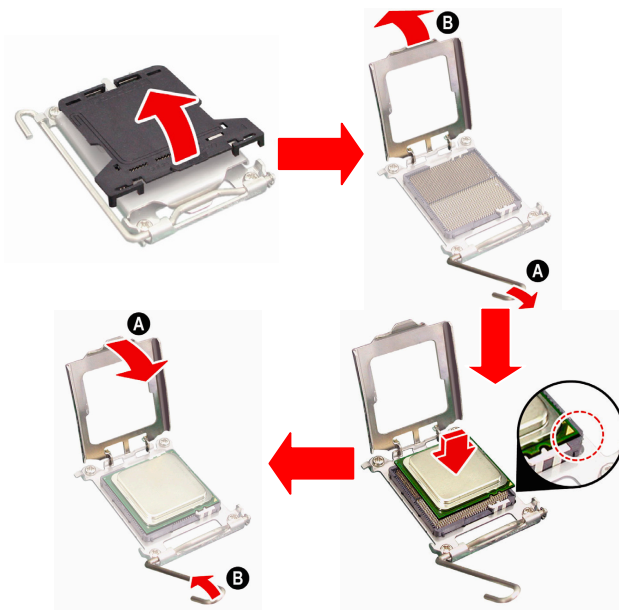
The diagram is provided as a visual guide to help you install the socket processor and may not be an exact representation of the processor you have.

Step 1: Take off the CPU protection cap.
Step 2: Pull the CPU lever up to unlock the CPU socket (A). Then open the socket in the direction as shown (B).
Step 3: Place the CPU on the CPU socket, ensuring that pin 1 is located in the right direction.
Step 4: Close the CPU socket cover (A) and press the CPU socket lever down to secure the CPU (B).

Take care when installing the processor as it has very fragile connector pins below the processor and can bend and break if inserted improperly.

2.5 - Heat sink Installation

After installing the processor, you should proceed to install the heat sink. The CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

For the safest method of installation and information on choosing the appropriate heat sink, use heat sinks validated by AMD. Please refer to AMD's website at www.amd.com.

The following diagram illustrates how to install heat sink onto the CPU of S4987.
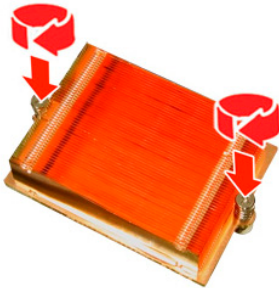
Place the heat sink on top of the CPU and secure it to the motherboard using two screws clockwise.

2.6 - Thermal Interface Material
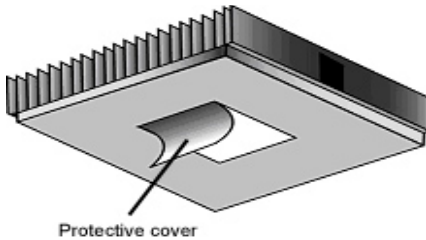
Protective cover

There are two types of thermal interface materials designed for use with the AMD® Opteron™ processors.

The most common material comes as a small pad attached to the heat sink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heat sink on the processor.

Thermal Compound

Processor Lid
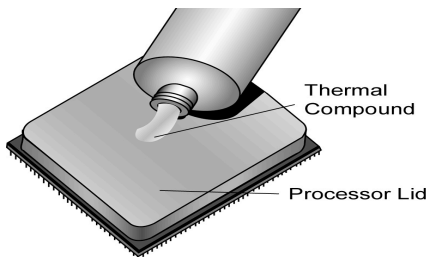
The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

NOTE	Always check with the manufacturer of the heat sink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements

2.7 - Finishing Installing the Heat sink

After you have finished installing the heat sink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heat sink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.
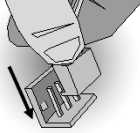
Once you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

2.8 - Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

KB/MS

COM1

200-PIN SO-DIMM
For OPMA Only

VGA1

USB2

USB1

LAN5 LAN3 LAN2

IB CON

SAS CON

LED5
SW1
LED4

88E1121

Mellanox
MT25204

ATI
ES1000

CPU2

CPU0

CPU3

DIMM32
DIMM31
DIMM30
DIMM29
DIMM28
DIMM27
DIMM26
DIMM25

DIMM17
DIMM18
DIMM19
DIMM20
DIMM21
DIMM22
DIMM23
DIMM24

DIMM16
DIMM15
DIMM14
DIMM13
DIMM12
DIMM11
DIMM10
DIMM 9

DIMM1
DIMM2
DIMM3
DIMM4
DIMM5
DIMM6
DIMM7
DIMM8

CPU1

PCI-E x 16 Slot

HTX Slot

nVidia
MCP55
Pro

BAT

LSI
1068E

BIOS

W83627HG-AW

SATA0 SATA1 SATA2 SATA3 SAS5 SAS7
SAS4 SAS6

PW7 PW3 PW4
PW8
IDE
PW2
PW6

22

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard

Type	Solutions for installing
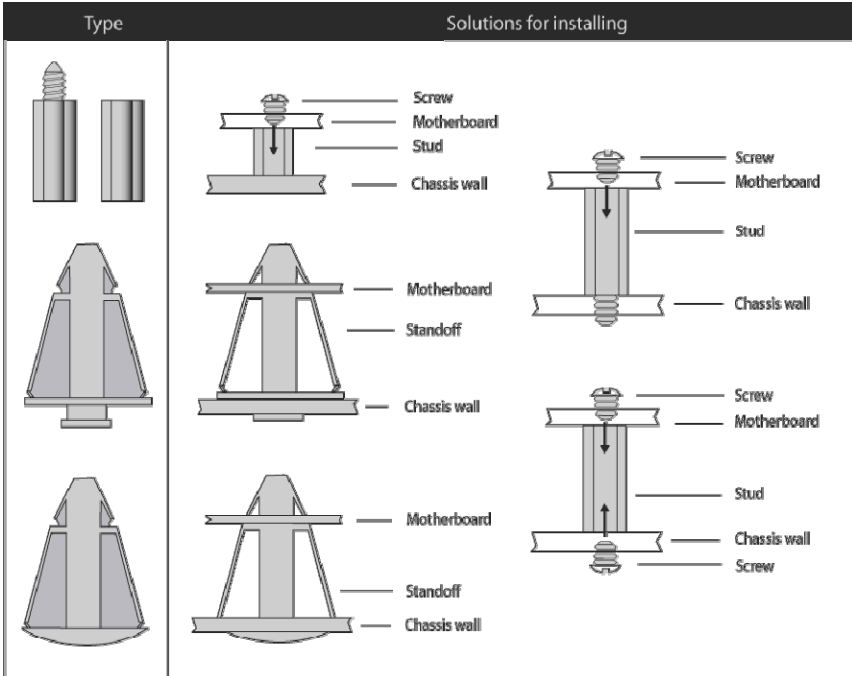
2.9 - Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Check the TYAN Web site at: **www.tyan.com** for details of the type of memory recommended for your motherboard.

The following diagram shows common types of DDR2 memory modules.

- AMD Opteron™ processors support 64bit (non-interleaved) or 128bit (interleaved) memory configuration.
- ECC Registered DDRII-400/533/667 memory modules are supported.
- All installed memory will automatically be detected and no jumpers or settings need changing.
- The Thunder n3600QX (S4987) supports up to 128GB of memory.

NOTE:
1). Refer to the memory population option table for detailed memory configuration instruction.
2). For the DIMM number please refer to the motherboard placement in "2.3 - Board Parts, Jumpers and Connectors" for memory installation.

Memory Population Option Table

To correctly install the memory in pairs (DIMMA# + DIMMB#), refer to the table for supported population options. Start installing Memory modules from DIMM7 and DIMM8.

	Single CPU Installed (CPU0 only)			Dual CPU installed (CPU0 and CPU1)			Four CPU installed		
Quantity of memory installed	2	4	8	4	8	16	8	16	32
CPU0_DIMM1(A)			√			√			√
CPU0_DIMM2(B)			√			√			√
CPU0_DIMM3(A)			√			√			√
CPU0_DIMM4(B)			√			√			√
CPU0_DIMM5(A)		√	√		√	√		√	√
CPU0_DIMM6(B)		√	√		√	√		√	√
CPU0_DIMM7(A)	√	√	√	√	√	√	√	√	√
CPU0_DIMM8(B)	√	√	√	√	√	√	√	√	√
CPU1_DIMM9(A)						√			√
CPU1_DIMM10(B)						√			√
CPU1_DIMM11(A)						√			√
CPU1_DIMM12(B)						√			√
CPU1_DIMM13(A)					√	√		√	√
CPU1_DIMM14(B)					√	√		√	√
CPU1_DIMM15(A)				√	√	√	√	√	√
CPU1_DIMM16(B)				√	√	√	√	√	√
CPU2_DIMM17(A)									√
CPU2_DIMM18(B)									√
CPU2_DIMM19(A)									√
CPU2_DIMM20(B)									√
CPU2_DIMM21(A)								√	√
CPU2_DIMM22(B)								√	√
CPU2_DIMM23(A)							√	√	√
CPU2_DIMM24(B)							√	√	√
CPU3_DIMM25(A)									√
CPU3_DIMM26(B)									√
CPU3_DIMM27(A)									√
CPU3_DIMM28(B)									√
CPU3_DIMM29(A)								√	√
CPU3_DIMM30(B)								√	√
CPU3_DIMM31(A)							√	√	√
CPU3_DIMM32(B)							√	√	√

Note:

1." √ " indicates a populated DIMM slot.

2. We strong recommend that install memory **in pairs**.

3. Please always install memory from the **furthest A channel DIMM   slot**.

Memory Installation Procedure

Follow these instructions to install memory modules into the Thunder n3600QX.

1.   Press the locking levers in the direction shown in the following illustration.
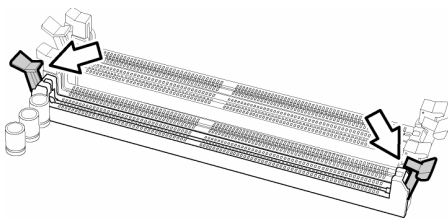
2.   Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.

Key slot
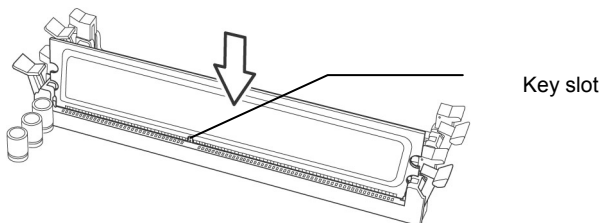
3.   Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.
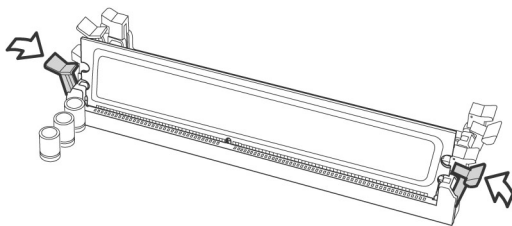
2.10 - Attaching Drive Cables

Attaching IDE Drive Cable
Attaching the IDE drive cable is simple. These cables are "keyed" to only allow them to be connected in the correct manner. TYAN motherboards have two on-board IDE channels, each supporting two drives. **The black connector designates the Primary channel, while the white connector designates the Secondary channel.**

Attaching IDE cables to the IDE connectors is illustrated below:
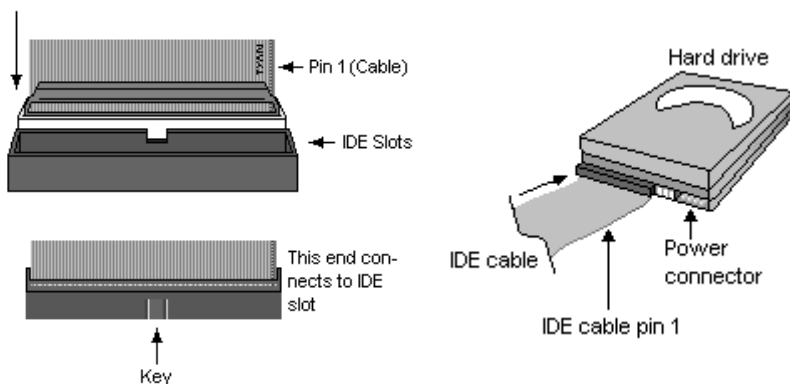
Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end(s) into the drive(s). Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard. The other two connectors are used to connect to drives.

NOTE: Always remember to properly set the drive jumpers. If only using one device on a channel, it must be set as Master for the BIOS to detect it.

TIP: Pin 1 on the IDE cable (usually designated by a colored wire) faces the drive's power connector.

Attaching Serial ATA Cables
The Thunder n3600QX (S4987) is equipped with **4** Serial ATA (SATA) channels as well as **4** SAS channels. Connections for these drives are very simple.

There is no need to set Master/Slave jumpers on SATA drives.

Please refer to FRU List for the related cables. If you are in need of SATA/SAS cables or power adapters please contact your place of purchase.

The following pictures illustrate how to connect an SATA drive
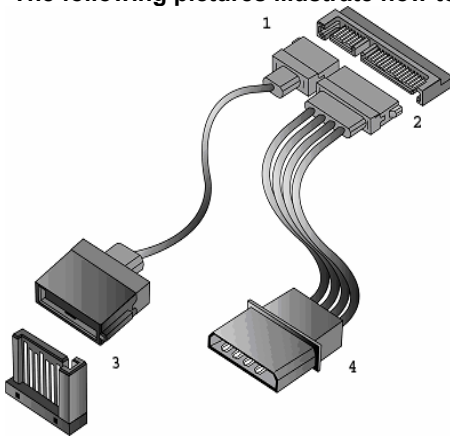
1. SATA drive cable connection

2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

Attaching Floppy Drive Cables

Attaching floppy diskette drives are done in a similar manner to hard drives. See the picture below for an example of a floppy cable. Most of the current floppy drives on the market require that the cable be installed with the colored stripe positioned next to the power connector. In most cases, there will be a key pin on the cable which will force a proper connection of the cable.

Twist at the end of the ribbon cable
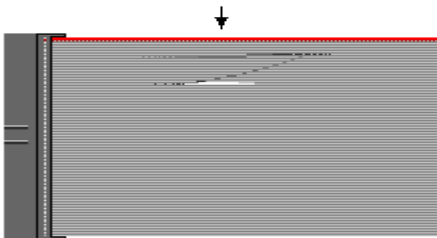
Attach first floppy drive (drive **A:**) to the end of the cable with the twist in it. Drive **B:** is usually connected to the next possible connector on the cable (the second or third connector after you install Drive **A:**).

2.11 - Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that may appear on your motherboard.

PCI-E x 16 slot

HTX slot

SO-DIMM slot
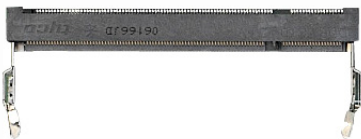
Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

TIP: It's good practice to install add-in cards in a staggered manner rather than making them directly adjacent to each other. Doing so allows air to circulate within the chassis more easily, thus improving cooling for all installed devices.

NOTE **YOU MUST ALWAYS** unplug the power connector to the motherboard before performing system hardware changes to avoid damaging the board or expansion device.

2.12 - Installing SO-DIMM Modules - OPMA Card

Your Thunder n3600QX (S4987) motherboard is equipped with a proprietary SO-DIMM connector. The SO-DIMM connector plays the role of OPMA connector and supports Tyan M3295 M2 card and 3rd party M3 OPMA card.

Follow these steps to install the OPMA Card (M3295) into the SO-DIMM slot.

M3295

SO-DIMM Socket

1. Insert OPMA Card (M3295) firmly into the socket by pressing down as shown in the diagram. Only it is firmly seated into the socket, two spring levers on each side will close and secure the card into the socket. There should be key on M3295 that fits the key in the SO-DIMM socket. The card may fit in only one way.
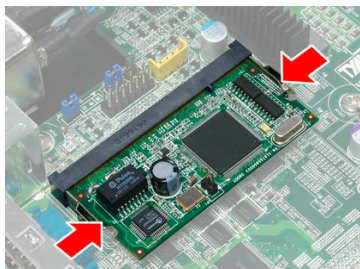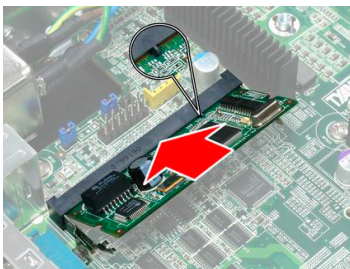
2. To remove M3295, simply push out the spring levers as shown and pull the card out of the socket.
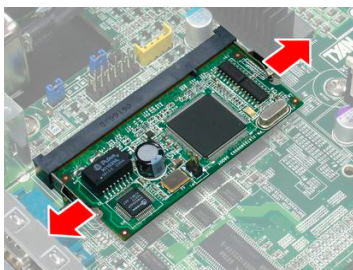
NOTE: You may follow the above steps to install other 3rd party M3 card.

2.13 - Connecting External Devices

Your motherboard supports a number of different interfaces through connecting peripherals. See the following diagrams for the details.
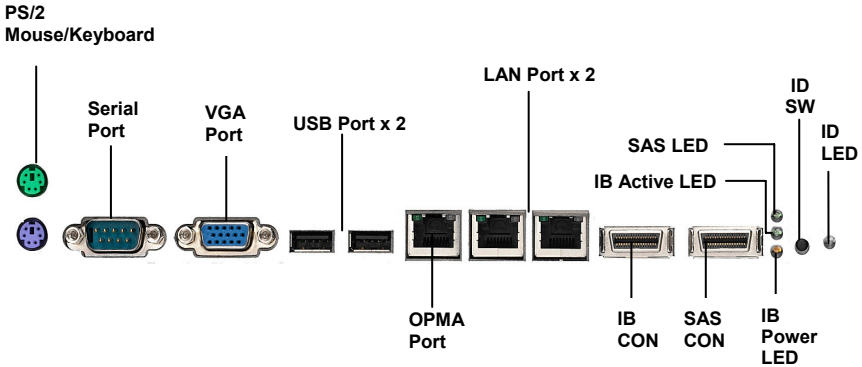
NOTE: Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

Onboard LAN LED Color Definition
The three onboard Ethernet ports have green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

10/100/1000 Mbps LAN Link/Activity LED Scheme			
LEFT RIGHT		**Left LED**	**Right LED**
10 Mbps	**Link**	**Green**	**Off**
	Active	**Blinking Green**	**Off**
100 Mbps	**Link**	**Green**	**Green**
	Active	**Blinking Green**	**Green**
1000 Mbps	**Link**	**Green**	**Yellow**
	Active	**Blinking Green**	**Yellow**
No Link		**Off**	**Off**

2.14 - Installing the Power Supply

There are six power connectors on your Thunder n3600QX (S4987). The Thunder n3600QX (S4987) supports 12V and 5.5V SB input DPS power supplies, please use below combination:

Refer to Diagram B for each power location.

PWR3/7/8: 4-Pin PWR Connector reserved for Tyan 2U Barebone only

PWR4: 4-Pin PWR Connector for Tyan M1223 only

PWR2: PWR Main Connector

PWR6: 8-Pin PWR Connector for Tyan M1223 and M1221

PWR3/7/8: PWR Connector reserved for Tyan 2U Barebone only (2Pin x 2)
PWR4: PWR Connector for Tyan M1223 only (2Pin x 2)

Signal	Pin	Pin	Signal
GND	1	3	+12V
GND	2	4	+12V

PWR6: Power Connector for Tyan M1221 only (4Pin x 2)

Signal	Pin	Pin	Signal
GND	1	5	+12V
GND	2	6	+12V
GND	3	7	+5V
GND	4	8	+3.3V

PWR2: PWR Main Connector

P1	+12V
P2	+12V
P3	+12V
P4	GND
P5	GND
P6	GND
Signal	Signal
P7	GND
P8	Neutral
P9	90~264V

Pin 9: 90~264V
Pin 8: Neutral
Pin 7: GND

We suggest using a 1000W or higher power supply; this of course depends on how many devices you attach. A 1000W is probably sufficient for systems however a higher wattage solution may be needed if the system is fully loaded. Look to the **www.tyan.com** website for further information.

NOTE	**YOU MUST** unplug the power supply before plugging the power cables to motherboard connectors.

2.15 – Finishing Up

Congratulations on making it this far! You're finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**

Chapter 3: BIOS Setup

3.1 About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print and are subject to change, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information even when the power is turned off.

To start the BIOS setup utility:
1. Turn on or reboot your system.
2. Press <Del> during POST (<Tab> on remote console) to start the BIOS setup utility.

3.2 – BIOS Menu Bar

The menu bar at the top of the windows lists these selections:

Main	To configure basic system setups
Advanced	To configure the advanced chipset features
PCI/PnP	To configure legacy Plug & Play or PCI settings
Boot	To configure system boot order
Security	To configure user and supervisor passwords
Chipset	To configure chipset management features
Exit	To exit setup utility

3.3   Setup Basics

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
<F1>	General help window
<ESC>	Exit current menu
← → arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up/down
<Tab> or <Shift-Tab>	Cycle cursor up/down
<Home> or <End>	Move cursor to top/bottom of the window
<PgUp> or <PgDn>	Move cursor to next/previous page
<->	Select the previous value/setting of the field
<+>	Select the next value/setting of the field
<F8>	Load Fail Safe default configuration values of the menu
<F9>	Load the Optimal default configuration values of the menu
<F10>	Save and exit
<Enter>	Execute command or select submenu

3.4   Getting Help

Pressing [**F1**] will display a small help window that describes the appropriate
keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**].

3.5   In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.
The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by TYAN or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

NOTE: The following pages provide the details of BIOS menu. Please be noticed that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated when this manual is written. Please visit Tyan's website at http://www.tyan.com for the information of BIOS updating.

3.6   BIOS Main Menu

The Main BIOS Menu is the first screen that you can navigate. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured, options in blue can be changed.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany it.

BIOS Setup Utility	
Main Advanced PCI/PnP Boot Security Chipset Exit	
System Overview	Use [ENTER], [TAB] or [SHIFT-TAB] to select a field
AMIBIOS Version : 08.00.xx Build Date : DD/MM/YY ID : 0AAAA000	Use [+] or [-] to configure system time.
Processor Dual-Core AMD Opteron™ Processor XXXX Speed : xxxx MHz Count : x	← → Select Screen
System Memory Size : xxxx MB	↑ ↓ Select Item Enter Go to Sub Screen F1 General Help
System Time [HH:MM:SS] System Date [MM:DD:YYYY]	F10 Save and Exit ESC Exit

Feature	Option	Description
Main		
System Time	HH : MM : SS	Set the system time
System Date	MM : DD : YYYY	Set the system date

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3.7   BIOS Advanced Menu

You can select any of the items in the left frame of the screen, such as Super I/O Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

```
                          BIOS Setup Utility
      Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit
 Advanced Settings
                                                    Configure CPU
 WARING: Setting wrong values in below sections may
              cause system to malfunction.

 ‣ CPU Configuration                                ← → Select Screen
 ‣ IDE Configuration                                ↑ ↓ Select Item
 ‣ Super IO Configuration                           Enter   Go to Sub Screen
 ‣ ACPI Configuration                               F1    General Help
 ‣ APM Configuration                                F10   Save and Exit
 ‣ Event Log Configuration                          ESC  Exit
 ‣ Hardware Health Configuration
 ‣ Remote Access Configuration
 ‣ USB Configuration
```

Feature	Option	Description
Advanced Settings		
CPU Configuration	**Menu Item**	Configure CPU
IDE Configuration	**Menu Item**	Configure the IDE device(s)
Super IO Configuration	**Menu Item**	Configures Super IO Chipset Nat417
ACPI Configuration	**Menu Item**	Section for Advanced ACPI Configuration
APM Configuration	**Menu Item**	Section for APM configuration
Event Log Configuration	**Menu Item**	Mark as read, Clear or View Event Log statistics
Hardware Health Configuration	**Menu Item**	Configure/monitor the Hardware Health
Remote Access Configuration	**Menu Item**	Configure Remote Access
USB Configuration	**Menu Item**	Configure the USB support

3.7.1 CPU Configuration

You can use this screen to view CPU Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

```
+-----------------------------------------------------------------------------+
|                            BIOS Setup Utility                               |
|    Main      Advanced    PCI/PnP    Boot    Security    Chipset    Exit     |
+-----------------------------------------------------------------------------+
| CPU Configuration                                    This option should     |
| Module Version :  XX.XX                              remain disabled for    |
| AGESA Version :   XXXXXX                             normal operation.      |
| Physical Count  :  X                                 The driver             |
| Logical Count   :  X                                 developer may          |
|                                                      disable it for testing |
|                                                      purpose.               |
| Dual Core AMD Opteron (tm) Processor    xxxxxxxx                            |
| Revision :                              xx                                  |
| Cache L1:                               xxxx                                |
| Cache L2:                               xxxx                                |
| Speed:                                  xxxx                                |
| Current FSB Multiplier :                xxxx                                |
| Maximum FSB Multiplier:                 xxxx                                |
| Able to change Freq.:                   Yes          ← → Select            |
| uCode Patch Level:                      None required Screen                |
|                                                      ↑ ↓ Select Item       |
| GART Error Reporting                    [Disabled]   +/-    Change         |
| Microcode Update                        [Enabled]    Option                 |
| SVM u Code Option                       [Enabled]    F1    General Help     |
| Runtime Legacy PSB                      [Disabled]   F10   Save and         |
| ACPI 2.0 Objects                        [Enabled]    Exit                   |
|                                                      ESC  Exit              |
+-----------------------------------------------------------------------------+
```

Feature	Option	Description
CPU Configuration		
Module Version	Read only	Displays information about CPU
AGESA Version		
Physical Count		
Logical Count		
Revision	Read only	Displays information about CPU
Cache L1		
Cache L2		
Speed		
Current FSB Multiplier		
Maximum FSB Multiplier		
Able to change Freq.		
uCode Patch Level		
GART Error Reporting	**Disabled**	This option should remain disabled for normal operation. The driver developer may enable it for the purpose of testing.
	Enabled	
Microcode Update	**Enabled**	Enable/Disable Microcode Update.
	Disabled	
SVM u Code Option	**Enabled**	Processor Assisted Virtualization.
	Disabled	
Runtime Legacy PSB	**Disabled**	Enable/Disable the generation of Power State Block for use of PowerNow(tm) driver in a single cover system.
	Enabled	
ACPI 2.0 Objects	**Enabled**	Enable/Disable the generation of ACPI_PPC,_PSS, and _PCT objects.
	Disabled	

3.7.2 IDE Configuration Sub-Menu

You can use this screen to select options for the IDE Configuration Settings. Use the up and down <Arrow> Keys to select an item. Use the <Plus> and <Minus> Keys to change the value of the selection options.

```
                          BIOS Setup Utility
        Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

 IDE Configuration                                      While entering setup,
                                                        BIOS auto detects the
                                                        presence of IDE
 Onboard IDE Controller          [Enabled]              devices. This displays
 Serial-ATA Devices              [Device 0/1]           the status of auto
                                                        detection of IDE
  ‣ nVidia RAID Setup                                   devices.

  ‣ Primary IDE Master
  ‣ Primary IDE Slave
  ‣ SATA0  (Dev5, Func0)                           ← → Select Screen
  ‣ SATA1  (Dev5, Func0)                           ↑ ↓ Select Item
  ‣ SATA2  (Dev5, Func1)                           +/-   Change Option
  ‣ SATA3  (Dev5, Func1)                           F1    General Help
                                                   F10   Save and Exit
 Hard Disk Write Protect         [Disabled]        ESC  Exit
 IDE Detect Time Out (Sec)       [35]
 ATA (PI) 80Pin Cable Detection  [Host & Device]
```

Feature	Option	Description
IDE Configuration		
Onboard IDE Controller	**Enabled**	Enable/Disable onboard IDE controller.
	Disabled	
Serial-ATA Devices	**Device 0/1**	Configure serial ATA devices.
	Disabled	
	Device 0	
Hard Disk Write Protect	**Disabled**	Enable/Disable device write protection. This will be effective only if device is accessed through BIOS.
	Enabled	
IDE Detect Time Out (Sec)	**0~35** (at 5 interval)	Select the time out value for detecting ATA/ATAPI device(s).
ATA (PI) 80Pin Cable Detection	**Host & Device**	Select the mechanism for detecting 80Pin ATA(PI) cable.
	Host	
	Device	

3.7.2.1 nVidia RAID Setup

Feature	Option	Description
BIOS Setup Utility Main **Advanced** PCI/PnP Boot Security Chipset Exit		
RAID Setup nVidia RAID Function [Disabled]		While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
SATA0 (Dev 5, Func0) [Disabled] SATA1 (Dev 5, Func0) [Disabled] SATA2 (Dev 5, Func1) [Disabled] SATA3 (Dev 5, Func1) [Disabled]		← → Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit
nVidia RAID Setup		
nVidia Function	**Disabled**	While entering setup, you can choose enabled/disabled RAID mode for each ATA channel.
	Enabled	
SATA0/1/2/3	Disabled	Enable/Disable specific SATA Drive as RAID.
	Enabled	

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3.7.2.2 Primary IDE Master/Slave Sub-Menu

BIOS Setup Utility						
Main	Advanced	PCI/PnP	Boot	Security	Chipset	Exit

Primary IDE Master

Device: Not Detected

Type	[Auto]	← → Select Screen
LBA /Large Mode	[Auto]	↑ ↓ Select Item
Block (Multi-Sector Transfer)	[Auto]	+/- Change Option
PIO Mode	[Auto]	Tab Select Field
DMA Mode	[Auto]	F1 General Help
S.M.A.R.T.	[Auto]	F10 Save and Exit
32 Bit Data Transfer	[Enabled]	ESC Exit

Feature	Option	Description
Primary IDE Master/Slave		
Type	**Auto**	Selects the type of device connected to the system.
	Not Installed	
	CD/DVD	
	ARMD	
LBA/Large Mode	**Auto**	Auto: Enabled LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
	Disabled	Disabled: Disabled LBA Mode.
Block (Multi-Sector Transfer)	**Auto**	Disabled: The Data transfer from and to the device occurs one sector at a time.
	Disabled	Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto**	Select the PIO Mode. Select Auto to enhance hard disk performance by optimizing the hard disk timing.
	0~4 (at 1 interval)	
DMA Mode	**Auto**	Select DMA Mode. Auto: Auto detected.
S.M.A.R.T.	**Auto**	S.M.A.R.T (Self-Monitoring Analysis and Reporting Technology) is a utility that monitors your disk status to predict hard disk failure.
	Disabled	
	Enabled	
32Bit Data Transfer	**Enabled**	Enable 32-bit to maximize the IDE hard disk data transfer rate.
	Disabled	

3.7.2.3 SATA0/1/2/3 Sub-Menu

```
                              BIOS Setup Utility
        Main     Advanced     PCI/PnP     Boot     Security     Chipset     Exit
  Third IDE Master

  Device: Not Detected

                                                       ← → Select Screen
  LBA /Large Mode                         [Auto]       ↑ ↓ Select Item
  Block (Multi-Sector Transfer)           [Auto]       +/-    Change Option
  PIO Mode                                [Auto]       Tab  Select Field
  DMA Mode                                [Auto]       F1     General Help
  S.M.A.R.T.                              [Auto]       F10  Save and Exit
  32 Bit Data Transfer                    [Enabled]    ESC  Exit
```

Feature	Option	Description
SATA 0/1/2/3		
LBA/Large Mode	**Auto**	Auto: Enabled LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
	Disabled	Disabled: Disabled LBA Mode.
Block (Multi-Sector Transfer)	**Auto**	Disabled: The Data transfer from and to the device occurs one sector at a time.
	Disabled	Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto**	Select the PIO Mode. Select Auto to enhance hard disk performance by optimizing the hard disk timing.
	0~4 (at 1 interval)	
DMA Mode	**Auto**	Select DMA Mode. Auto: Auto detected.
S.M.A.R.T.	**Auto**	S.M.A.R.T (Self-Monitoring Analysis and Reporting Technology) is a utility that monitors your disk status to predict hard disk failure.
	Disabled	
	Enabled	
32Bit Data Transfer	**Enabled**	Enable 32-bit to maximize the IDE hard disk data transfer rate.
	Disabled	

3.7.3   Super I/O Configuration Sub-Menu

You can use this screen to select options for the Super I/O settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility	
Main **Advanced** PCI/PnP Boot Security Chipset Exit	
Configure Win627 Super I/O Chipset	Allows BIOS to enable or disable Floppy Controller.
Serial Port1 Address [3F8/IRQ4] Serial Port2 Address [2F8/IRQ3] Serial Port2 Mode [Normal] Chassis Intrusion Detect [Disabled] Watchdog Mode [Disabled]	← → Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Configure Win627 Super I/O Chipset		
Serial Port1 Address	**3F8 IRQ4**	Allow BIOS to select Serial Port1 Base Addresses.
	3E8 IRQ4	
	2E8 IRQ3	
	Disabled	
Serial Port2 Address	**2F8 IRQ3**	Allow BIOS to select Serial Part2 Base Addresses.
	3F8 IRQ4	
	2E8 IRQ3	
	Disabled	
Serial Port2 Mode	**Normal**	Allow BIOS to select mode for Serial Port2.
	IrDA	
	ASK IR	
Chassis Intrusion Detect	**Disabled**	Enable/Disable the function of chassis intrusion detection. When chassis open event is detected, BIOS will record the event.
	Enabled	
Watchdog Mode	**Disabled**	Watchdog Timer sets 2/4/6/8/10 minutes. When WD time-out occurs, system will auto reboot.
	2 Minutes	
	4 Minutes	
	6 Minutes	
	8 Minutes	
	10 Minutes	

3.7.4 ACPI Configuration Sub-Menu

Use this screen to select options for ACPI. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on this page. The screen is shown below.

BIOS Setup Utility						
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

ACPI Settings

▸ Advanced ACPI Configuration
▸ Chipset ACPI Configuration

Enable ACPI Configuration settings

← → Select Screen
↑ ↓ Select Item
+/-   Change Option
F1   General Help
F10 Save and Exit
ESC Exit

3.7.4.1 Advanced ACPI Configuration Sub-Menu

```
                          BIOS Setup Utility
      Main     Advanced     PCI/PnP     Boot     Security     Chipset     Exit

   Advanced ACPI Configuration

                                                    ← → Select Screen
   ACPI Version Features          [ACPI v1.0]       ↑ ↓ Select Item
   ACPI APIC support              [Enabled]         +/-   Change Option
   AMI OEMB table                 [Enabled]         F1    General Help
   Headless mode                  [Disabled]        F10  Save and Exit
                                                    ESC  Exit
```

Feature	Option	Description
Advanced ACPI Configuration		
ACPI Version Features	ACPI v3.0	Set this value to allow or prevent the system to be complaint with the ACPI 2.0 specification.
	ACPI v2.0	
	ACPI v1.0	
ACPI APIC Support	**Enabled**	This option allows you to define whether or not to enable APIC features.
	Disabled	
AMI OEMB table	**Enabled**	Set this value to allow the ACPI BIOS to add a pointer to an OEMB table in the Root System Description Table (RSDT) table. Note: OEMB table is used to pass POST data to the AMI code during ACPI O/S operations.
	Disabled	
Headless mode	Enabled	Enable or disable Headless operation mode through ACPI.
	Disabled	

3.7.4.2 Chipset ACPI Configuration Sub-Menu

		BIOS Setup Utility				
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

Chipset ACPI Configuration

MCP55 ACPI HPET Table   [Enabled]

←→ Select Screen
↑↓ Select Item
+/-   Change Option
F1   General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Chipset ACPI Configuration		
MCP55 ACPI HPET Table	**Enabled**	Enable/Disable MCP55 ACPI HPET Table.
	Disabled	

3.7.5 APM Configuration

BIOS Setup Utility						
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

Power Management/APM	[Enabled]	Enable or Disable APM
Power Button Mode	[On/Off]	
Video Power Down Mode	[Enabled]	
Green PC Monitor Power State	[Standby]	
Hard Disk Power Down Mode	[Enabled]	
Hard Disk Time Out (Minute)	[Disabled]	
Force Throttle	[Disabled]	
Manual Throttle Ratio	[50%]	
System Thermal	[Disabled]	
Thermal throttle Ratio	[50%]	← → Select Screen
Resume On PME#	[Disabled]	↑ ↓ Select Item
Resume On PCIE Wake#	[Disabled]	+/- Change Option
Resume On LAN (MAC)	[Disabled]	Enter Go to Sub Screen
Resume On Ring	[Disabled]	F1 General Help
Resume On PS/2 Keyboard	[Disabled]	F10 Save and Exit
Resume On RTC Alarm	[Disabled]	ESC Exit

Feature	Option	Description
APM Configuration		
Power Management/APM	**Enabled**	Enables or Disable APM.
	Disabled	
Power Button Mode	**On/Off**	Go into ON/OFF or suspend when power button is pressed.
	suspend	
Video Power Down Mode	**Enabled**	Power Down Video is Off.
	Disabled	
Green PC Monitor Power State	**Standby**	Options: standby suspend off.
	Suspend	
	Off	
Hard Disk Power Down Mode	**Enabled**	Power Down, Hard Disk in suspend Mode.
	Disabled	
Hard Disk Time Out (Minute)	1	Hard Disk Time Out in specified Minutes.
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	Disabled	
Force Throttle	Enabled	Disable, Enable the force to thermal throttling function.
	Disabled	
Manual Throttle Ratio	87.5%	Select the Duty Cycle in Throttle mode.
	75%	
	62.5%	
	50%	
	37.5%	
	25%	
	12.5%	
System Thermal	Enabled	Disable/Enable Thermal to generate a power management event.
	Disabled	
Thermal throttle Ratio	87.5%	Select the duty cycle in throttle when the thermal override condition occurs.
	75%	
	62.5%	
	50%	
	37.5%	
	25%	
	12.5%	
Resume On PME#	Enabled	Disable/Enable PME to generate a wake event.
	Disabled	
Resume On PCIE Wake	Enabled	Disable/Enable PME to generate a wake event.
	Disabled	

	Enabled	Disable/Enable LAN(MAC) to
Resume On LAN (MAC)	**Disabled**	generate a wake event.
Resume On Ring	Enabled	Disable/Enable RI to generate a
	Disabled	wake event.
Resume On PS/2 Keyboard	Enabled	Disable/Enable PS/2 Keyboard
	Disabled	to generate a wake event.
Resume On RTC Alarm	Enabled	Disable/Enable RTC event to
	Disabled	wake after a power failure.

3.7.6 Event Log Configuration Sub-Menu

You can use this screen to view the Event Log Control Menu. This logs system events (such as Clear CMOS, ECC memory errors, etc) and writes the log into NVRAM. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

```
                          BIOS Setup Utility
         Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

 Event Logging details                          View all unread events
                                                on the Event Log.

 View Event Log
 Mark All Events as Read                        ← → Select Screen
 Clear Event Log                                ↑ ↓ Select Item
                                                +/-    Change Option
                                                Enter Go to Sub Screen
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC  Exit
```

Feature	Option	Description
Event Logging details		
View Event Log	—	Views all unread events on the Event Log.
Mark All Events as Read	OK	Marks all unread events as read.
	Cancel	
Clear Event Log	OK	Erases all of events.
	Cancel	

3.7.7 Hardware Health Configuration Sub-Menu

You can use this screen to view the Hardware Health Configuration Settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

BIOS Setup Utility						
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

Hardware Health Configuration	Enables Hardware Health Monitoring Device.
Auto FAN Control [Disabled] ▸ FAN Configuration ▸ Voltage Configuration ▸ Temperature Configuration	← → Select Screen ↑ ↓ Select Item +/- Change Option Tab Select Field F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Hardware Health Configuration		
Auto FAN Control	Enabled	Enable/Disable AUTOFAN control. The CPU0,2,3 FAN min duty cycle is 25%, and the CPU 1 FAN min duty cycle is 30%.
	Disabled	

3.7.7.1 FAN Configuration Sub-Men

	BIOS Setup Utility					
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

Fan Configuration

FAN1	Reading	XXXXX RPM
FAN2	Reading	XXXXX RPM
FAN3	Reading	XXXXX RPM
FAN4	Reading	XXXXX RPM
FAN5	Reading	XXXXX RPM
FAN6	Reading	XXXXX RPM
FAN7	Reading	XXXXX RPM
FAN8	Reading	XXXXX RPM
FAN9	Reading	XXXXX RPM
FAN10	Reading	XXXXX RPM
FAN11	Reading	XXXXX RPM
FAN12	Reading	XXXXX RPM
FAN13	Reading	XXXXX RPM
FAN14	Reading	XXXXX RPM

← → Select Screen
↑ ↓ Select Item
+/-   Change Option
Tab Select Field
F1   General Help
F10 Save and Exit
ESC Exit

3.7.7.2 Voltage Configuration Sub-Men

	BIOS Setup Utility					
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

Voltage Configuration

CPU0	VCORE	XXXV
CPU0	VDD	XXXV
CPU1	VCORE	XXXV
CPU1	VDD	XXXV
CPU2	VCORE	XXXV
CPU2	VDD	XXXV
CPU3	VCORE	XXXV
CPU3	VDD	XXXV

VLPT	1.2V
5VSB	
VDD5V	
VDD12V	
SB1.5V	
SB1.4V	

← → Select Screen
↑ ↓ Select Item
+/-   Change Option
Tab Select Field
F1   General Help
F10 Save and Exit
ESC Exit

3.7.7.3 Temperature Configuration Sub-Men

```
                              BIOS Setup Utility
        Main      Advanced     PCI/PnP     Boot     Security     Chipset     Exit

  Temperature Configuration


  CPU0  Temperature:                  XXX°C/ XXX°F          ← → Select Screen
  CPU1  Temperature:                  XXX°C/ XXX°F          ↑ ↓ Select Item
  CPU2  Temperature:                  XXX°C/ XXX°F          +/-    Change Option
  CPU3  Temperature:                  XXX°C/ XXX°F          Tab   Select Field
                                                            F1     General Help
  MCP55 Temperature:                  XXX°C/ XXX°F          F10   Save and Exit
  System Temperature:                 XXX°C/ XXX°F          ESC  Exit
```

3.7.8   Remote Access Configuration Sub-Menu

You can use this screen to view the Remote Access Configuration Menu. This feature allows access to the Server remotely via serial port. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

```
                          BIOS Setup Utility
       Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit
Configure Remote Access type and parameters          Select remote access
                                                     type.
Remote Access                    [Disabled]

Serial Port Number               [COM1]
Base Address, IRQ
Serial Port Mode                 [115200 8,n,1]      ← → Select Screen
Flow Control                     [None]              ↑ ↓  Select Item
Redirection After BIOS POST      [Always]            +/-    Change Field
Terminal Type                    [ANSI]              F1     General Help
VT-UTF8 Combo Key Support        [Enabled]           F10  Save and Exit
Serdir Memory Display Delay      [NO Delay]          ESC  Exit
```

Feature	Option	Description
Configure Remote Access type and parameters		
Remote Access	Enabled	Enables remote access to system through serial port.
	Disabled	
Serial Port Number	**COM1**	Select Serial Port for console redirection.
	COM2	
Serial Port Mode	**115200 8, n,1**	Select Serial Port Settings..
	56700 8,n,1	
	38400 8,n,1	
	19200 8,n,1	
	09600 8,n,1	
Flow Control	**None**	Select Flow Control for console redirection.
	Hardware	
	Software	
Redirection After BIOS POST	Disabled	Disabled: turns of the redirection after Boot.
	Always	Redirection is active during POST and during Boot loader.
Terminal Type	ANSI	Select the target terminal type.
	VT100	
	VT-UTF8	
VT-UTF8 Combo Key Support	**Enabled**	Enable/Disable VT-UTF8 combination key support for ANSI/VT100 terminals.
	Disable	
Serdir Memory Display Delay	**No Delay**	Gives the delay in seconds to display memory information.
	Delay 1Sec	
	Delay 2Sec	
	Delay 4Sec	

3.7.9   USB Configuration Sub-Menu

You can use this screen to view the USB Configuration Menu.
Use the up and down arrow (↑/↓) keys to select an item. Use the
Plus and Minus (+/-) keys to change the value of the selected option.
The settings are described on the following pages.

```
                            BIOS Setup Utility
        Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

  USB Configuration                                Enables support for
                                                   legacy USB.
  Module Version – X.XX.X-XX.X

  USB Devices Enabled:
             None
                                                   ← → Select Screen
  Legacy USB Support          [Enabled]            ↑ ↓ Select Item
  USB 2.0 Controller Mode     [HiSpeed]            +/-    Change Option
  BIOS EHCI Hand-Off          [Enabled]            F1     General Help
                                                   F10  Save and Exit
  ‣ USB Mass Storage Device Configuration          ESC  Exit
```

Feature	Option	Description
USB Configuration		
Legacy USB Support	Disabled	Enables support for legacy USB.
	Enabled	
USB 2.0 Controller Mode	**Hi Speed**	Configure the USB 2.0 controller in Hi Speed (480Mbps) or Full Speed (12Mbps).
	Full Speed	
BIOS EHCI Hand-Off	**Enabled**	This is a work around for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
	Disabled	

3.7.9.1 USB Mass Storage Device Configuration Sub-Men

BIOS Setup Utility						
Main	**Advanced**	PCI/PnP	Boot	Security	Chipset	Exit

USB Mass Storage Device Configuration	← → Select Screen ↑ ↓ Select Item
	+/- Change Option Tab Select Field
USB Mass Storage Reset Delay [20 Sec] 　　Device # 1 XXXX 　　Emulation Type [Auto]	F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
USB Mass Storage Device Configuration		
USB Mass Storage Reset Delay	**20 Sec**	Number of seconds POST waits for the USB mass storage device after start unit command.
	10 Sec	
	30 Sec	
	40 Sec	
Emulation Type	**Auto**	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD.
	Floppy	
	Forced FDD	
	Hard Disk	
	CDROM	

3.8   PCI PnP Menu

You can use this screen to view PnP (Plug & Play) BIOS Configuration Menu. This menu allows the user to configure how the BIOS assigns resources & resolves conflicts. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

```
                        BIOS Setup Utility
      Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

  Advanced PCI/PnP Settings                      Clear NVRAM during
                                                 System Boot.

  WARING: Setting wrong values in below sections may
  cause system to malfunction.

  Clear NVRAM                     [No]           ← → Select Screen
  Plug & Play O/S                 [No]           ↑ ↓  Select Item
  PCI Latency Timer               [64]           +/-    Change Option
  Allocate IRQ to PCI VGA         [Yes]          F1    General Help
  Palette Snooping                [Disabled]     F10  Save and Exit
  PCI IDE BusMaster               [Enabled]      ESC  Exit
```

Feature	Option	Description
Advanced PCI/PnP Settings		
Clear NVRAM	**No**	Clears NVRAM during system Boot.
	Yes	
Plug & Play OS	Yes	No: lets the BIOS configure all the devices in the system. Yes: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
	No	
PCI Latency Timer	32	This setting controls how many PCI clocks each PCI device can hold the bus before another PCI device takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. Values in units of PCI clocks for PCI device latency timer register.
	64	
	96	
	128	
	160	
	192	
	224	
	248	
Allocate IRQ to PCI VGA	**Yes**	Yes: assigns IRQ to PCI VGA card if card requests IRQ.
	No	
Palette Snooping	**Disabled**	This is the default setting and should not be changed unless the VGA card manufacturer requires Palette Snooping to be Enabled. Enabled: informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.
	Enabled	
PCI IDE BusMaster	Disabled	Enabled: BIOS uses PCI bus mastering for reading / writing to IDE drives.
	Enabled	
	Reserved	

3.9 Boot Menu

You can display Boot Setup option by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

BIOS Setup Utility						
Main	Advanced	PCI/PnP	**Boot**	Security	Chipset	Exit

Boot Settings	Configures settings during System Boot.
▶ Boot Settings Configuration	← → Select Screen ↑ ↓ Select Item
▶ Boot Device Priority	Enter Go to Sub Screen F1 General Help
▶ Hard Disk Drives ▶ Removable Drives ▶ Network Drives	F10 Save and Exit ESC Exit

3.9.1 Boot Settings Configuration Sub-Menu

Use this screen to select options for the Boot Settings Configuration. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility						
Main	Advanced	PCI/PnP	**Boot**	Security	Chipset	Exit

Boot Settings Configuration		Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
Quick Boot	[Disabled]	
Quiet Boot	[Disabled]	
Add On ROM Display Mode	[Force BIOS]	
Boot up Num-Lock	[On]	
PS/2 Mouse Support	[Auto]	
Wait for 'F1' if Error	[Enabled]	← → Select Screen
Hit 'DEL' Message Display	[Enabled]	↑ ↓ Select Item
Interrupt 19 Capture	[Enabled]	+/- Change Option F1 General Help
Endless Boot	[Disabled]	F10 Save and Exit ESC Exit

Feature	Option	Description
Boot Settings Configuration		
Quick Boot	Enabled	This option allows user bypass BIOS self test during POST.
	Disabled	
Quiet Boot	**Disabled**	Disabled: displays normal POST messages.
	Enabled	Enabled: displays OEM log instead of POST messages.
Add On ROM Display Mode	**Force BIOS**	Allows user to force BIOS/Option ROM of add-on cards to be displayed during quiet boot.
	Keep Current	
Boot up Num-Lock	**On**	Selects Power-on state for Numlock.
	Off	
PS/2 Mouse Support	Enabled	Selects support for PS/2 Mouse.
	Disabled	
	Auto	
Wait for 'F1' If Error	**Enabled**	Waits for F1 key to be present if error occurs.
	Disabled	
Hit 'DEL' Message Display	**Enabled**	Displays "Press DEL to run Setup" in POST.
	Disabled	
Interrupt 19 Capture	Disabled	Enabled: allows option ROMs to trap interrupt 19.
	Enabled	
Endless Boot	Enabled	Enable/Disable endless loop boot from BBS table.
	Disabled	

3.9.2   Boot Device Priority

Use this screen to select options for the Boot Device Priority. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

```
                        BIOS Setup Utility
    Main      Advanced     PCI/PnP    Boot    Security    Chipset     Exit

 Boot Device Priority                              Specifies the boot
                                                   sequence from the
 1st Boot Device            [xx,xxx-xxxxx:xxx]     available devices.
 2nd Boot Device            [xx,xxx-xxxxx:xxx]
                                                   A device enclosed in
                                                   parenthesis has
                                                   been disabled in the
                                                   corresponding type
                                                   menu.

                                                   ← → Select Screen
                                                   ↑ ↓ Select Item
                                                   +/-    Change Option
                                                   F1     General Help
                                                   F10   Save and Exit
                                                   ESC  Exit
```

Feature	Option	Description
Boot Device Priority		
1st Boot Device 2nd Boot Device	xx,xxx-xxxxx:xxx	Settings for boot priority. These can be customized depending on your preference.
	Disabled	

3.9.3 Hard Disk Drives

BIOS Setup Utility						
Main	Advanced	PCI/PnP	**Boot**	Security	Chipset	Exit

Hard Disk Drives		Specifies the boot sequence from the available devices.
1st Drive	[xx,xxx-xxxxx:xxx]	←→ Select Screen ↑↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Hard Disk Drives		
1st Drive	xx,xxx-xxxxx:xxx	Specifies the boot sequence from the available devices.
	Disabled	

3.9.4   Removable Drives

```
                         BIOS Setup Utility
      Main     Advanced    PCI/PnP    Boot    Security   Chipset    Exit

  Removable Drives                                    Specifies the boot
                                                      sequence from the
                                                      available devices.
  1st Drive                         [xx,xxx-xxxxx:xxx]
                                                      ← → Select Screen
                                                      ↑ ↓ Select Item
                                                      +/-    Change Option
                                                      F1     General Help
                                                      F10   Save and Exit
                                                      ESC  Exit
```

Feature	Option	Description
Network Drives		
1st Drive	xx,xxx-xxxxx:xxx	Specifies the boot sequence from the available devices.
	Disabled	

3.9.5   Netwod Drives

```
                         BIOS Setup Utility
      Main     Advanced    PCI/PnP    Boot    Security   Chipset    Exit

  Netword Drives                                      Specifies the boot
                                                      sequence from the
                                                      available devices.
  1st Drive                         [xx,xxx-xxxxx:xxx]
  2nd Drive                         [xx,xxx-xxxxx:xxx]
                                                      ← → Select Screen
                                                      ↑ ↓ Select Item
                                                      +/-    Change Option
                                                      F1     General Help
                                                      F10   Save and Exit
                                                      ESC  Exit
```

Feature	Option	Description
Network Drives		
1st Drive 2nd Drive	xx,xxx-xxxxx:xxx	Specifies the boot sequence from the available devices.
	Disabled	

3.10 Security Menu

The system can be configured so that all users must enter a password every time the system boots or when BIOS Setup is entered, using either the Supervisor password or User password. The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must clear CMOS and reconfigure.

BIOS Setup Utility	
Main Advanced PCI/PnP Boot **Security** Chipset Exit	
Security Settings	Install or change the password.
Supervisor Password : Not Installed User Password : Not Installed Change Supervisor Password Change User Password Boot Sector Virus Protection [Disabled]	← → Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Security Settings		
Supervisor Password:	**Not Installed**	If the password has been set, Installed displays. If no password is set, Not Installed displays.
	Installed	
User Password:	**Not Installed**	If the password has been set, Installed displays. If no password is set, Not Installed displays.
	Installed	
Change Supervisor Password	—	Selects this option to change or install Supervisor Password.
Change User Password	—	Selects this option to change or install User Password.
Boot Sector Virus Protection	**Disabled**	When it is set to [Enabled], BIOS will issue a virus warning message and beep if a write to the boot sector or the partition table of the HDD is attempted.
	Enabled	

3.11 Chipset Menu

This menu allows the user to customize functions of the AMD Chipsets. North Bridge configuration contains options for Memory & CPU settings. South Bridge configuration contains options for SM Bus & USB. Additional configuration for the AMD8131 PCI-X Tunnel is available in the PCI-X Configuration Menu. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

BIOS Setup Utility						
Main	Advanced	PCI/PnP	Boot	Security	**Chipset**	Exit

Advanced Chipset Settings	Options for NB
WARNING: Setting wrong values in below sections may cause system to malfunction. ▸ Northbridge Configuration ▸ Southbridge/MCP55 Configuration ▸ Hyper Transport Configuration	← → Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit

3.11.1 Northbridge Configuration Sub-Menu

This menu gives options for customizing memory &
Hypertransport settings. Select a menu by highlighting it using the
Arrow (↑/↓) keys and pressing Enter. The settings are described
on the following pages.

```
                          BIOS Setup Utility
        Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

 NorthBridge Chipset Configuration


  ▸ Memory Configuration
  ▸ ECC Configuration
  ▸ IOMMU Option Menu
 Power Down Control            [Auto]

 Alternate VID                 [Auto]


 Memory CLK                    :XXX MHz
 CAS latency (Tcl)             :XX
 RAS/CAS Delay (Trcd)          :X CLK          ←→ Select Screen
 Min Active RAS (Tras)         :X CLK          ↑ ↓ Select Item
 Row Precharge Time (Trp)      :X CLK          Enter Go to Sub Screen
 RAS/RAS Delay (Trrd)          :X CLK          F1   General Help
 Row Cycle (Trc)               :XX CLK         F10  Save and Exit
 Asynchronous Latency          :X ns           ESC  Exit
```

Feature	Option	Description
NorthBridge Chipset Configuration		
Power Down Control	**Auto**	Allow DIMMs to enter power down mode by deasserting the clock enable signal when DIMMs are not in use.
	Disable	
Alternate VID	**Auto**	Specify the alternate VID while in low power status.
	0.850V	
	1.050V	
	1.025V	
	1.000V	
	0.975V	
	0.950V	
	0.925V	
	0.900V	
	0.875V	
	0.825V	
	0.800V	
Memory CLK	Read only	It shows the clock frequency of the installed SDRAM.

Feature	Option	Description
NorthBridge Chipset Configuration		
CAS Latency (Tcl)	Read only	This controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it.
RAS/CAS Delay (Trcd)	Read only	When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance.
Min Active RAS (Tras)	Read only	This setting allows you to select the number of clock cycles allotted for the RAS pulse width, according to DRAM specifications. The less the clock cycles, the faster the DRAM performance.
Row Precharge Time (Trp)	Read only	This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its chage before DRAM refresh, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system.
RAS/RAS Delay (Trrd)	Read only	Auto uses hardware compensation values. Other values add to or subtract from hardware generated value. Recommended setting is Auto.
Row Cycle (Trc)	Read only	Bits 7-4. RAS#-active to RAS#-active or auto refresh of the same bank.
Asynchronous Latency	Read only	Bits 3-0. This filed should be loaded with a 4-bit value equal to the maximum asynchronous latency in the DRAM read round-trip loop.

3.11.1.1 Memory Configuration Sub-Menu

This menu has options for memory speed & latency. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

```
                        BIOS Setup Utility
      Main      Advanced     PCI/PnP    Boot     Security    Chipset     Exit
                                                          MEMCLK can be set
                                                          by the code using
 Memory Configuration                                     AUTO, or if you use
                                                          LIMIT, you can set one
                                                          of the standard values.
 Memclock Mode                           [Auto]
    Memory Clock Value                   [400]

 MCT Timing Mode                         [Auto]
    CAS Latency (CL)                     [Auto]
    TRAS                                 [Auto]
    TRP                                  [Auto]
    TRCD                                 [Auto]
    TRRD                                 [Auto]
    TRC                                  [Auto]

 Bank Interleaving                       [Auto]         ← → Select Screen
 Enable Clock to All DIMMs               [Disabled]     ↑ ↓ Select Item
 MemClk Tristate C3/ATLVID               [Disabled]     +/-    Change Option
 CS Spuring Enable                       [Disabled]     F1    General Help
 DQS Signal Training Control             [Enabled]      F10   Save and Exit
 Memory Hole Remapping                   [Enabled]      ESC  Exit
```

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Feature	Option	Description
Memory Configuration		
Memclock Mode	Limit	Select the DRAM Frequency programming method. If Auto, the DRAM speed will be based on SPDs. If Limit, the DRAM speed will not exceed the specified value. If Manual, the DRAM speed specified will be programmed by users.
	Auto	
	Manual	
Memory Clock Value	**400**	Set Memory Value
	533	
	667	
	800	
MCT Timing Mode	Manual	Allow user to configure the MCT Timing Mode manually.
	Auto	
CAS Latency (CL)	**Auto**	Set CAS Latency
	3.0 ~ 6.0	
TRAS	**Auto**	Set TRAS
	5CLK ~ 18CLK	
TRP	**Auto**	Set TRP
	3CLK ~ 6CLK	
TRCD	**Auto**	Set TRCD
	3CLK ~ 6CLK	
TRRD	**Auto**	Set TRRD
	2T ~ 5T	
TRC	**Auto**	Set TRC
	11T ~ 25T	
Bank Interleaving	Disabled	Enable Bank Memory Interleaving
	Auto	
Enable Clock to All DIMMs	Enabled	Enable unused clocks to DIMMs even memory slots are not populated.
	Disabled	
MemClk Tristate C3/ATLVID	Enabled	Enable/Disable MemClk Tri-Stating during C3 and Alt VID
	Disabled	
CS Spuring Enable	Enabled	Reserve a spare memory rank in each mode.
	Disabled	
DQS Signal Training Control	**Enabled**	Turning this off will require custom memory timings programming.
	Disabled	Training will be automatically disabled if CS sparing is enabled.
Memory Hole Remapping	**Enabled**	Enable Memory Remapping around Memory Hole
	Disabled	

3.11.1.2 ECC Configuration Sub-Menu

This menu allows the user to configure ECC setup for system & DRAM. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

```
                        BIOS Setup Utility
     Main     Advanced     PCI/PnP    Boot    Security    Chipset    Exit
                                              DRAM ECC allows
 ECC Configuration                            hardware to report and
                                              correct memory errors
                                              automatically
 DRAM ECC Enable              [Enabled]       maintaining system
    4-Bit ECC Mode            [Disabled]      integrity.
    DRAM SCRUB REDIRECT       [Disabled]
    DRAM BG Scrub             [Disabled]      ← → Select Screen
 L2 Cache BG Scrub            [Disabled]      ↑ ↓  Select Item
 Data Cache BG Scrub          [Disabled]      +/-   Change Option
                                              F1    General Help
                                              F10  Save and Exit
                                              ESC  Exit
```

Feature	Option	Description
ECC Configuration		
DRAM ECC Enable	**Enabled**	DRAM ECC allows hardware to report and correct memory errors automatically maintaining system integrity.
	Disabled	
4-Bit ECC Mode	**Disabled**	Enable 4-Bit ECC Mode. Note: Also known as CHIPKILL ECC Mode
	Enabled	
DRAM SCRUB REDIRECT	**Disabled**	DRAM SCRUB REDIRECT allows the system to correct DRAM ECC errors immediately when they occur, even if background scrubbing is on.
	Enabled	
DRAM BG Scrub	**Disabled**	DRAM scrubbing corrects memory errors so later reads are correct. Doing this while memory is not being used improves performance. Note: When AMD's node interleave feature is enabled, BIOS will force DRAM scrub off.
	40ns	
	80ns	
	160ns	
	320ns	
	640ns	
	1.28us	
	2.56us	
	5.12us	
	10.2us	
	20.5us	
	41.0us	
	81.9us	
	163.8us	
	327.7us	
	655.4us	
L2 Cache BG Scrub	**Disabled**	Allows the L2 Data Cache RAM to be corrected while idle.
	40ns	

Feature	Option	Description
ECC Configuration		
	80ns	
	160ns	
	320ns	
	640ns	
	1.28us	
	2.56us	
	5.12us	
	10.2us	
	20.5us	
	41.0us	
	81.9us	
	163.8us	
	327.7us	
	655.4us	
	Disabled	
	40ns	
	80ns	
	160ns	
	320ns	
	640ns	
	1.28us	
Data Cache BG Scrub	2.56us	Allows the L1 Data Cache RAM to be corrected while idle.
	5.12us	
	10.2us	
	20.5us	
	41.0us	
	81.9us	
	163.8us	
	327.7us	
	655.4us	

3.11.1.3 IOMMU Option Menu

This menu has options for IOMMU. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

```
                          BIOS Setup Utility
      Main     Advanced   PCI/PnP    Boot    Security   Chipset    Exit

 IOMMU Mode                        [AGP Present]      Set GART size in
                                                      systems without AGP,
                                                      or disable altogether.
                                                      Some OSes require
                                                      valid GART for proper
                                                      operation,  If AGP is
                                                      present, select
                                                      appropriate option to
                                                      ensure proper AGP
                                                      operation.


                                                      ← → Select Screen
                                                      ↑ ↓ Select Item
                                                      +/-    Change Option
                                                      F1    General Help
                                                      F10  Save and Exit
                                                      ESC  Exit
```

Feature	Option	Description
IOMMU Configuration		
IOMMU Mode	**AGP Present**	Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation, If AGP is present, select appropriate option to ensure proper AGP operation.
	Disabled	
	32 MB	
	64 MB	
	128 MB	
	256 MB	
	512 MB	
	1 GB	

3.11.2   Southbridge Configuration Sub-Menu

This menu gives options for southbridge devices settings. Select
a menu by highlighting it using the Arrow (↑/↓) keys and pressing
Enter. The settings are described on the following pages.

```
                          BIOS Setup Utility
      Main    Advanced    PCI/PnP    Boot    Security    Chipset    Exit

 SouthBridge Chipset Configuration


 CPU/LDT Spread Spectrum          [Center Spread]
 PCIE Spread Spectrum             [Enabled]
 SATA Spread Spectrum             [Enabled]

 Primary Graphics Adapter          [PCI Express ->PCI]
 USB1.1 Controller                [Enabled]
 USB2.0 Controller                [Enabled]        ← → Select Screen
 LAN1                             [Auto]           ↑ ↓ Select Item
 LAN2                             [Auto]           Enter Go to Sub Screen
                                                   F1    General Help
 Restore on AC Power Loss          [Last State]    F10  Save and Exit
 SAS Function                     [Enabled]        ESC  Exit
 SAS Option ROM                   [Disabled]
```

Feature	Option	Description
SouthBridge Chipset Configuration		
CPU/LDT Spread Spectrum	Disabled	Disabled Up Spread Center Spread. Select CPU/LDT Spread Spectrum Mode.
	Up Spread	
	Center Spread	
PCIE Spread Spectrum	Disabled	Select PCIE Spread Spectrum Mode.
	Enabled	
SATA Spread Spectrum	Disabled	Select SATA Spread Spectrum Mode.
	Enabled	
Primary Graphics Adapter	**PCI Express ->PCI**	Set Primary Graphics Adapter Mode.
	PCI -> PCI Express	
USB 1.1	**Enabled**	Enable/Disable USB 1.1 Controller.
	Disabled	
USB 2.0	**Enabled**	Enable/Disable USB 2.0 Controller.
	Disabled	
LAN1	**Auto**	LAN1 Configuration
	Disabled	
LAN2	**Auto**	LAN2 Configuration
	Disabled	
Restore on AC Power Loss	Power Off	System State after Restore on AC Power Loss
	Power On	
	Last State	
SAS Function	**Enabled**	Enable/disable SAS Function.
	Disabled	
SAS Option ROM	Enabled	Enable/disable SAS Option.
	Disabled	

3.11.3 Hyper Transport MCP55 Configuration Sub-Menu

This menu gives Hyper Transport Links settings. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

```
                          BIOS Setup Utility
     Main     Advanced     PCI/PnP    Boot    Security    Chipset    Exit

  Hper Transport MCP55 Configuration


  Mcp55(SB) to K8 (CPU) Freq Auto        [Disabled]    ← → Select Screen
  Mcp55(SB) to K8 (CPU) Frequency        [1000 MHz]    ↑ ↓ Select Item
  Mcp55(SB) to K8 (CPU) LinkWidth        [16↓,16↑]     Enter Go to Sub Screen
                                                       F1    General Help
                                                       F10  Save and Exit
                                                       ESC  Exit
```

Feature	Option	Description
Hyper Transport MCP55 Configuration		
Mcp55(SB) to K8 (CPU) Freq Auto	Enabled	MCP55 (SB) to K8 (CPU) Frequency Selection by CPU capability.
	Disabled	
Mcp55(SB) to K8 (CPU) Frequency	200	MCP55 (SB) to K8 (CPU) Frequency Selection.
	400	
	600	
	800	
	1000	
	1200	
	1400	
	1600	
Mcp55(SB) to K8 (CPU) LinkWidth	4↓4↑	MCP55 (SB) to K8 (CPU) link width selection.
	8↓8↑	
	16↓16↑	

3.12 Exit Menu

You can display an Exit BIOS Setup option by highlighting it
Arrow (↑/↓) keys and pressing Enter.

```
                            BIOS Setup Utility
        Main    Advanced   PCI/PnP   Boot   Security    Chipset   Exit

  Exit Options                                    Exit system setup after
                                                  saving the changes.

  Save Changes and Exit                           F10 key can be used for
  Discard Changes and Exit                        this operation.
  Discard Charges
                                                  ← → Select Screen
  Load Optimal Defaults                           ↑ ↓ Select Item
  Load Failsafe Defaults                          Enter Go to Sub Screen
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC  Exit
```

Save Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are stored into CMOS.
System will use the new settings to boot up.

Discard Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are not stored into CMOS.
System will use the old settings to boot up.

Discard Changes
Use this option to restore all new setup values that you have made
but not saved into CMOS.

Load Optimal Defaults
Use this option to load default performance setup values.
Use this option when system CMOS values have been corrupted or
modified incorrectly.

Load Failsafe Defaults
Use this option to load all default failsafe setup values.
Use this option when troubleshooting.

NOTE

Chapter 4: Diagnostics

NOTE: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN website at: http://**www.tyan.com**.

4.1 Beep Codes

Fatal errors, which halt the boot process, are communicated through two kinds of audible beeps.
•A single long beep followed by two short beeps: It indicates that a video error has occurred.
•A single long beep repeatedly: It indicates that a DRAM error has occurred.
The most common type of error is a memory error.

Before contacting your vendor or TYAN Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

4.2 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN web site: http://**www.tyan.com**/

NOTE: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

4.3 AMIBIOS Post Code

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer.Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.

Checkpoint	Description
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

Appendix I: How to Make a Driver Diskette

Follow the steps below to make a driver diskette from the TYAN driver CD provided.

1. Start the system and insert the TYAN CD into the CD-ROM drive to boot from CD. You will see the following menu. Then press [1] and [Enter] to boot the system to Tyan diskette maker. (If you would like to boot from hard disk, press 0 and Enter or just wait for 10 seconds to boot automatically from hard disk.).

```
Boot from CD:

ISOLINUX 2.00 2002-10-25  Copyright (C) 1994-2002 H. Peter Anvin
0) Boot from first hard drive
1) Boot to TYAN diskette maker
boot: 1_
```

2. Choose the chipset vender which you need from the main menu.

```
                    TYAN Driver Diskette Maker V1.0


                          ** Main Menu**
                    ====Choose Chipset Vendor====
        01          Adaptec
        02          Intel
        03          LSI
        04          nVidia
        05          Promise
        06          Silicon Image
        07          VIA


                    EXIT
```

3. The following picture pops up after selecting the chipset model.

```
                    TYAN Driver Diskette Maker


                            ** nVidia **
                    ====Choose Chipset Model====

    01          nVidia NVRAID


                EXIT
```
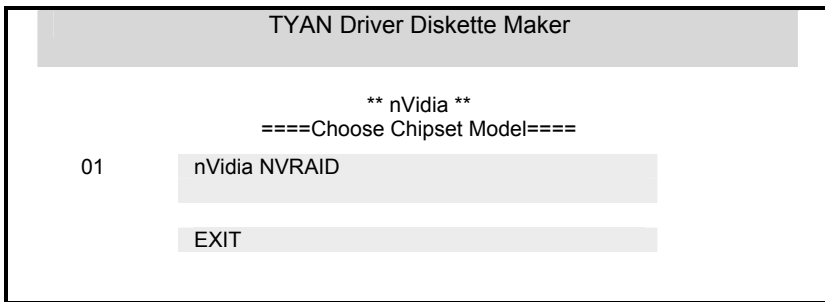
4. After selecting the chipset model, select the OS to start the diskette making.

```
                    TYAN Driver Diskette Maker


                    ====Example Chipset Driver====


Diskette  =01=   Microsoft Windows 2000 32-bit
Diskette  =02=   Microsoft Windows XP 32-bit
Diskette  =03=   Microsoft Windows XP 64bit
Diskette  =04=   Microsoft Windows 2003 64-bit


                Back
```
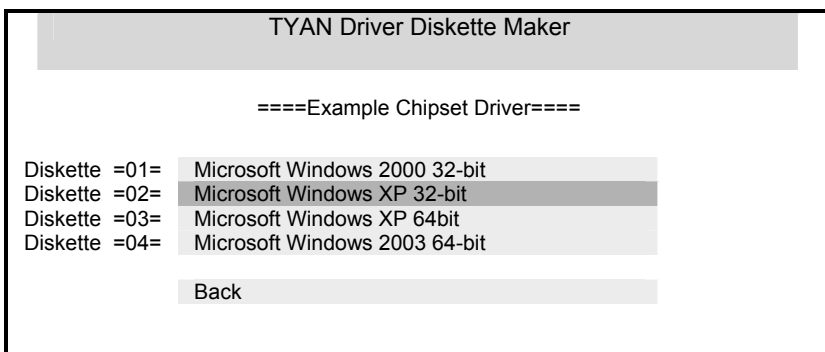
5. Follow the instruction on menu to insert a diskette and press [ENTER].

```
\Please insert a formatted diskette into A:/ and press [ENTER]
Writing image to drive A:
Track: 36  Hoad: 8 Sector: 1
```
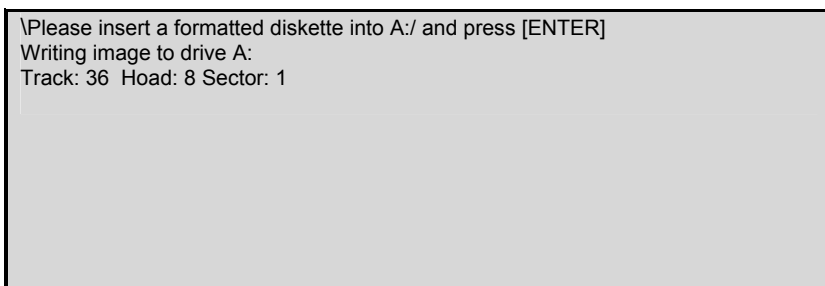
6. Using "ESC" key to quit the Tyan diskette maker. The system will
    automatically restart.

Appendix II: LSI Logic Config Utility

NOTE: This appendix just provides a brief introduction of the LSI Logic integrated RAID solution for LSI Logic controller LSISAS 1068E.
For detail of SAS RAID (S4987), please visit
http://www.Lsilogic.com/contacts/index.html
to refer to LSI manual.

The main LSI Logic Config Utility menu is the first screen you can navigate that shows you how to configure and use the components of the LSI Logic integrated raid (IR) software product with LSI Logic controller — LSI SAS1068E.

To start the LSI Logic Config Utility:
1. Turn on or reboot your system;
2. Press <Ctrl+C> during POST to start the LSI Logic Config Utility;
3. On the Adapter list screen, use the arrow keys to select an LSI Logic SAS adapter (SAS1068E), as shown in figure X.1;

```
LSI Logic Config Utility      v6.12.00.00 (2006.10.31)
Adapter List   Global Properties
Adapter    PCI  PCI  PCI  PCI   FW Revision        Status    Boot
           Bus  Dev  Fnc  Slot                               Order
SAS1068E   06   00   00   21    1.18.00.00-IR      Enabled   0




Esc = Exit Menu        F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order   Ins/Del = Alter Boot List
```

Figure X.1

4. Press <Enter> to go to the Adapter Properties screen as shown in figure X.2

```
LSI Logic Config Utility       v6.12.00.00 (2006.10.31)
Adapter Properties -- SAS1068E

          Adapter                    SAS1068E
          PCI Slot                   21
          PCI Address(Bus/Dev/Func)  06:00:00
          MPT Firmware Revision      1.18.00.00-IR
          SAS Address                500E0810:00000050
          NV DATA Version            25.03              M
          Status                     Enabled
          Boot Order                 0
          Boot Support               [Enabled BIOS & OS]


          RAID Properties


          SAS Topology


          Advanced Adapter Properties
Esc = Exit Menu        F1/Shift+1 = Help
+Enter = Select Item          -/+ = Change Item
```

Figure X.2

On the Adapter properties screen, use the arrow keys to select **RAID Properties** on the screen and press **<Enter>.**

When you are prompted to select a volume type, select **Create XX** (such as IM, IME or IS) **volume** as shown in figure X.3**.** The create New Array screen illustrates a list of disks that can be added to a volume.

```
LSI Logic Config Utility       v6.12.00.00 (2006.10.31)
Select New Array Type -- SAS1068E

       Create IM Volume        Create Integrated Mirror Array of 2
                               disks plus an optional hot spare. Data
                               on the primary disk may be migrated.


       Create IME Volume       Create Integrated Mirrored Enhanced
                               Array of 3 to 8 disks including an
                               optional hot spare.
                               ALL DATA on array disks will be DELETED!


       Create IS Volume        Create Integrated Striping array of
                               2 to 8 disks.
                               ALL DATA on array disks will be DELETED!


ESC=Exit Menu       F1/Shift+1=Help
Enter = Choose array type to create
```

Figure X.3

5. Move the cursor to the "RAID disk" column to select a disk. To add a disk to the volume, change the "NO" to "YES" by pressing "+ Key", "- Key", or "space bar".

5.1 *Creating an IM (RAID 1) volume:* When the disk is added, you may either keep the existing data or overwrite it. Press **"M"** to keep the

existing data on the first disk or press **"D"** to overwrite it.

If you keep the existing data, this is called a *migration*. The first disk will be mirrored onto the second one, so the data you want to keep must be on the first disk added to the volume. And in this way, any data on the second disk is overwritten.

5.2 *Creating an IME (RAID 1E) volume:* Repeat this step to select a total of three to eight disks for the volume (or three to seven disks if you will create a global hot spare).

5.3 *Creating IS (RAID 0) volume:* There are several limitations when creating an IS (RAID 0) volume.

  5.3.1 All disks must be either SATA or SAS (with SMART support); Disks must have 512-byte blocks and must not have removable media;

  5.3.2 There must be 2 (included) to 8 (included) drives in a valid IS volume. Hot spare drives are not allowed;

  5.3.3 After disks have been added, the Array Size field will reflect the size of the new volume.

6. When the volume has been fully configured, press **"C"** and then select **save changes** and **exit this menu** to commit the changes.

Note: Integrated striping (RAID 0) does not provide any data protection in the event of disk failure. It is primarily used to increase speed.

Appendix III: InfiniBand Installation Guide

InfiniBand™ enabling, Optional for S4987WG2NGI2 only

Note: The appendix just gives a draft picture of the InfiniBand™ driver installation, for the detail please visit http://www.mellanox.com/ to download the latest InfiniBand Driver and users' manual.

The InfiniBand™ Architecture (IBA) is an industry standard that defines a new high-speed switched fabric subsystem designed to connect processor nodes and I/O nodes to form a system area network. This new interconnected method moves away from the local transaction-based I/O model across buses to a remote message-passing model across channels. The architecture is independent of the host operating system (OS) and the processor platform.

Installer
- Installer developed using installShiled which is the most popular tool for building installers
- MSI format
- Simple, self explained GUI installation
- Can be run in batch mode (no GUI) by' msiexec/quit'
- Default install dir:\program files\Mellanox
- Add the installed package to "Add remove programs" and "start - > Program
- > Mellanox"

Some important notes:

– Your S4987 CD includes InfiniBand Driver, and for the latest Driver version, please visit: http://www.mellanox.com/ to download the driver:
  Click OFED to download Linux driver.
  Click WinIB to download Windows driver.

– Supported HCA (Host Channel Adapters) must be installed before WinIB installation.

– Since IB drivers are not certified by Microsoft, several security alerts will pop during installation. Please accept them all.
  *To prevent this please change to "ignore" in "My computer - >properties - > Hardware -> Driver signing";

– During installation "Find new hardware wizard" will popup. Please choose "cancel" for all instances.

– Install Log file:\Windows\setupapi.log.

The following diagrams may guide you how to install the InfiniBand Driver.
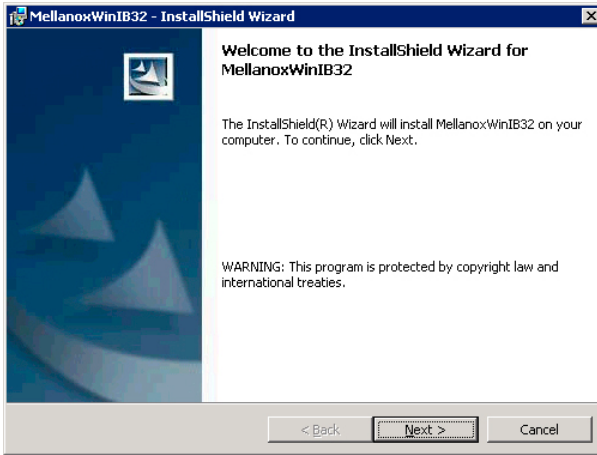
Welcome Screen

License Agreement
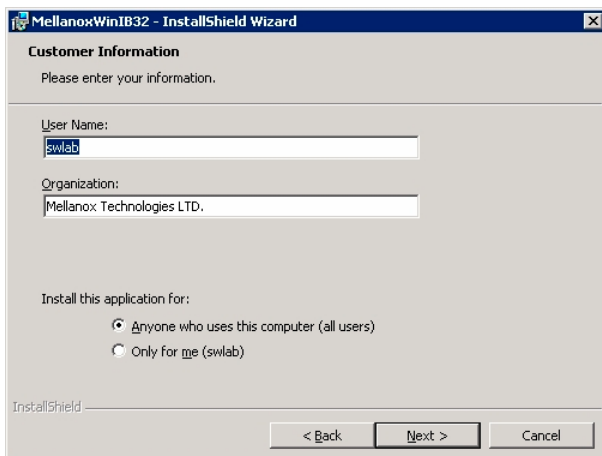
Registration Info
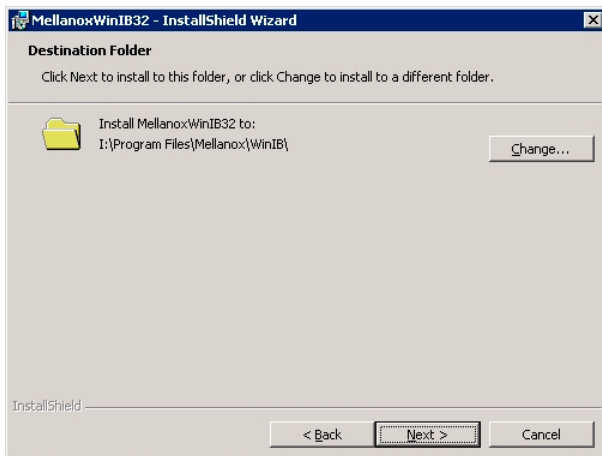
Install Path SDP/WSD Activation
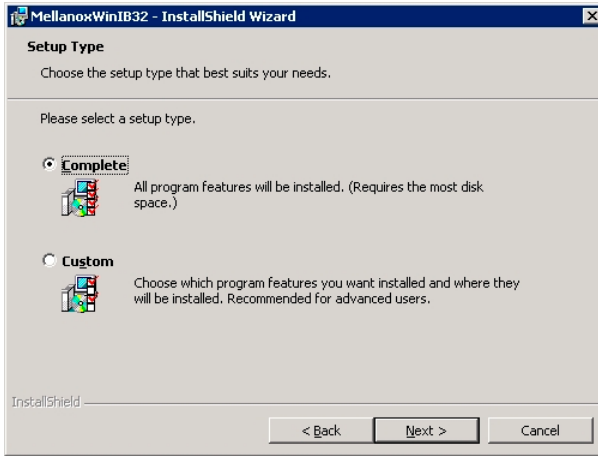
Complete/Custom
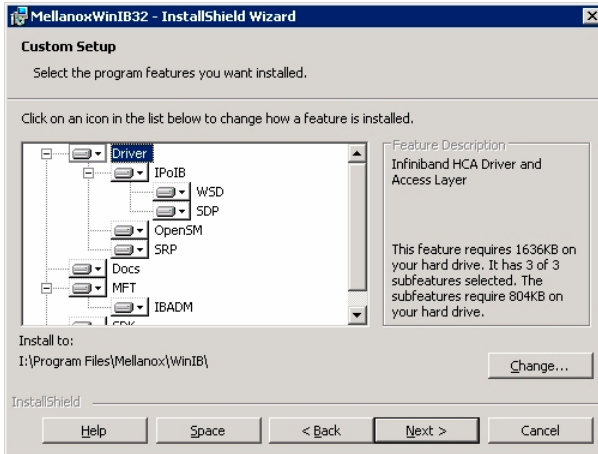
Components Selection.
Only SDP or WSD may be installed. Not both! Below, SDK…
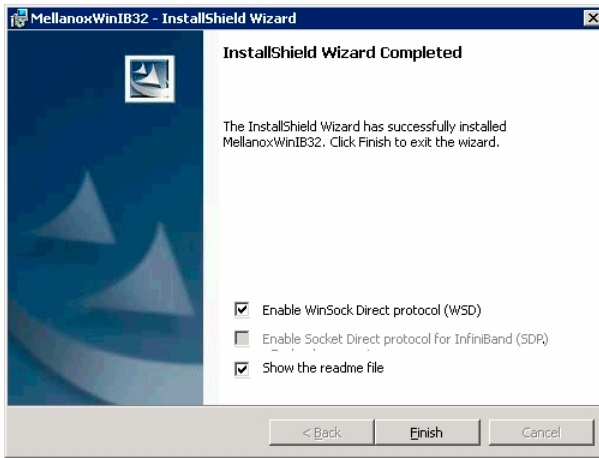
SDP/WSD Activation

The installer installs 3 types of devices:
– InfiniBand Fabric
– HCA
– IPoIB Interface
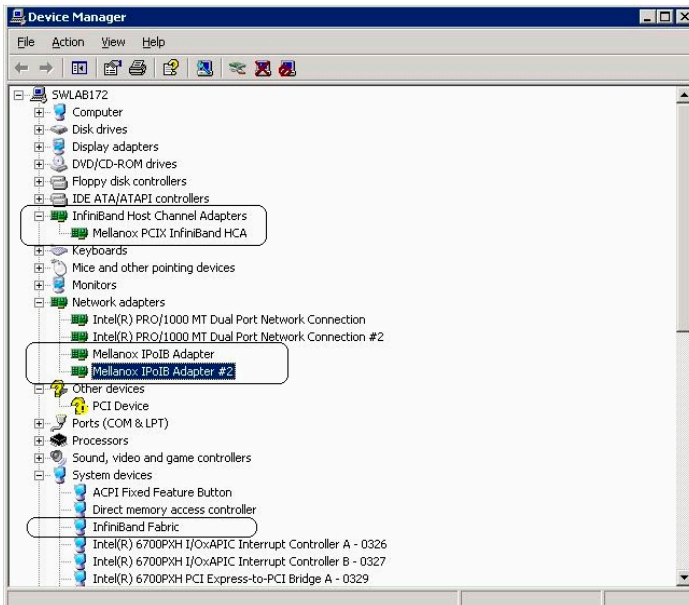
Uninstall InfiniBand Driver

- Uninstall can be done from the "Add/Remove Program" of the control panel or from the "Start -> Programs -> Mellanox -> WinIB";
- After the uninstall one MUST restart the machine to complete the uninstall process;

Appendix IV: Recommended Accessory List

For integrating your Thunder n3600QX (S4987) into a 1U/2U system, you can either equip your S4987 with the Tyan Barebone qualified accessories or use others with the same specification as a reference.
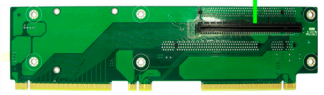
Power Supply Unit
Below is detailed information of recommended power supply unit. You may contact COLDWATT (PSU vendor) directly if having any interest:
www.coldwatt.com

Vendor	COLDWATT
Vendor model name	CWA2-1000-10-TY01
Tyan model name	CPSU - 0240
Picture	
Description	1000W PSU

Riser Card
The following provides information on riser cards of Tyan 1U/2U Barebone solutions with S4987 motherboard. You may ask Tyan for support if having any interest.

Tyan model name	M2061	M2083 - RS	M4987- HTX
Picture			
Description	PCI-E to PCI-X riser; 1U	PCI-E to PCI-E riser, 1U	HTX riser card,1U
Installation Location	PCI-E x 16 slot	PCI-E x 16 slot	HTX slot

Tyan model name	M4987- 2U	
Picture	Front view	Rear view
Description	(2) PCI-E x16 slots w/ x8 signal and (1) HTX slot, 2U	
Installation Location	PCI-E x 16 slot and HTX slot	

If you are interested in Tyan 1U GT26-B4987 accessory list, please visit **http://www.tyan.com/support_download_fru.aspx?model=B.GT26B4987** for details.

For the Tyan 2U TN27-B4987 accessory list (not available at the time of print), please visit www.tyan.com for further details.

Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs only at 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path can carry. Greater bandwidth results in greater speed.

BBS (BIOS Boot Specification): a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, which provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data; usually from an application though it is also used when printing and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it to a disk drive. While this improves system performance (reading to or writing from a disk drive a single time is much faster than doing so repeatedly) there is the possibility of

losing your data should the system crash. Information in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM socket because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, it is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN's BIOS updates can be found at http://**www.tyan.com**

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

HyperTransport^{TM}: a high speed, low latency, scalable point-to-point link for interconnecting ICs on boards. It can be significantly faster than a PCI bus for an equivalent number of pins. It provides the bandwidth and flexibility critical for today's networking and computing platforms while retaining the fundamental programming model of PCI.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

IDE INT (IDE Interrupt): a hardware interrupt signal that goes to the IDE.

I/O (Input/Output): the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock

up your system. Plug-n-Play operating systems can take care of these details for you.

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

Parallel port: transmits the bits of a byte on eight different wires at the same time.

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM: a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

PXE (Preboot Execution Environment): one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was designed to define a standard set of preboot protocol services within a client with the goal of allowing networked-based booting to boot using industry standard protocols.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly and multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID

level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: RAID I/O Steering (Intel)

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data and is often referred to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SCSI Interrupt Steering Logic (SISL): Architecture that allows a RAID controller, such as AcceleRAID 150, 200 or 250, to implement RAID on a system board-embedded SCSI bus or a set of SCSI busses. SISL: SCSI Interrupt Steering Logic (LSI) (only on LSI SCSI boards)

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SDRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SLI (Scalable Link Interface): NVIDIA SLI technology links two graphics cards together to provide scalability and increased performance. NVIDIA SLI takes advantage of the increased bandwidth of the PCI Express bus architecture, and features hardware and software innovations within NVIDIA GPUs (graphics processing units) and NVIDIA MCPs (media and communications processors). Depending on the application, NVIDIA SLI can deliver as much as two times the performance of a single GPU configuration.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

ZCR (Zero Channel RAID): PCI card that allows a RAID card to use the onboard SCSI chip, thus lowering cost of RAID solution

ZIF Socket (Zero Insertion Force socket): these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shifts the processor over and down, guiding it into the board and locking it into place.

Technical Support

If a problem arises with your system, you should first turn to your dealer for direct support. Your system has most likely been configured or designed by them and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assistance for you. Furthermore, if you purchased your system from a dealer near you, take the system to them directly to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

If these options are not available for you then Tyan Computer Corporation can help. Besides designing innovative and quality products for over a decade, Tyan has continuously offered customers service beyond their expectations. Tyan's website (**www.tyan.com**) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest software and operating system components to keep their systems running as powerful and productive as possible. Tyan also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, Tyan serves multiple market segments with the industry's most competitive services to support them.

"Tyan's tech support is some of the most impressive we've seen, with great response time and exceptional organization in general" **- Anandtech.com**

Please feel free to contact us directly for this service at **techsupport@tyan.com**

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN website for FAQ's, bulletins, driver updates, and other information: **http://www.tyan.com**
3. Contact your dealer for help BEFORE calling TYAN.
4. Check the TYAN user group: **alt.comp.periphs.mainboard.TYAN**

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

NOTE: A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN will pay to have the board shipped back to you.

Notice for the USA
Compliance Information Statement (Declaration of Conformity Procedure) DoC
FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

This device may not cause harmful interference, and
This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and the receiver.
Plug the equipment into an outlet on a circuit different from that of the receiver.
Consult the dealer on an experienced radio/television technician for help.

Notice for Canada
This apparatus complies with the Class A limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux norms de Classe A d'interference radio tel que specifie par le Ministere Canadien des Communications dans les reglements d'ineteference radio.)

Notice for Europe (CE Mark)
This product is in conformity with the Council Directive 89/336/EEC, 92/31/EEC (EMC).

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion appears if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

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